

RESEARCH MEMORANDUM

A PRESSURE-DISTRIBUTION INVESTIGATION OF THE AERODYNAMIC

CHARACTERISTICS OF A BODY OF REVOLUTION IN THE

VICINITY OF A REFLECTION PLANE AT

MACH NUMBERS OF 1.41 AND 2.01

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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

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SUMMARY

A pressure-distribution investigation has been conducted in the Langley 4- by 4-foot supersonic pressure tunnel to determine the change in the aerodynamic characteristics of a blunt-based body of revolution with a fineness ratio of 8 as the position of the body is varied with respect to a flat plate or reflection plane. Tests were made at Mach numbers of 1.41 and 2.01, a Reynolds number, based on body length, of 4.54×10^6 , and model incidence angles with respect to the plate of 0° and 0° . The data are compared with theoretical results.

For small body-plate separation distances, the body is subject to positive chord-force increments, normal-force increments directed toward the plate, and pitching-moment increments tending to move the model nose away from the plate. As the separation distance is increased (within the region of the reflected nose shock), the direction of these force and moment increments is reversed.

The prediction of the chord-force increments and the variation and order of magnitude of the normal-force increments is very good.

INTRODUCTION

The prediction of the mutual interference effects of wings and bodies in combination is difficult because of the complex nature of the flow fields involved. In the study of this problem, a knowledge of the interference phenomena for configurations where the flow fields are relatively simple would prove to be of great value in establishing the bounds of

validity of existing theory. Also, by a progressive increase in the complexity of the flow fields and an application of the knowledge gained from the relatively simple cases, a much greater insight of the fully integrated wing-body problem may be gained. With this purpose in mind, an investigation was undertaken to determine the change in the aerodynamic characteristics of a body as the position of the body was varied with respect to a flat plate or reflection plane alined with the airstream.

Pressure measurements on the body and the plate have been obtained for several different positions of the model with respect to the plate and for body incidence angles, measured in a plane through the body axis and perpendicular to the plate, of 0° and $\pm 3^{\circ}$. The tests were made in the Langley 4- by 4-foot supersonic pressure tunnel at Mach numbers of 1.41 and 2.01 and a Reynolds number, based on body length, of $4.54 \times 10^{\circ}$. The data are compared with theoretical results.

SYMBOLS

ρ	mass density of air
V	airspeed
a	speed of sound in air
М	Mach number, V/a
q	dynamic pressure, $\frac{1}{2} pV^2$
p	free-stream static pressure
p ₁	local static pressure
P	pressure coefficient, $\frac{p_1 - p}{q}$
L	length of body
R	local radius of body
r	distance normal to body axis
$\beta = \sqrt{M^2}$	- 1

- θ body polar angle, deg (see fig. 1)
- angle of incidence of body axis, measured in a plane through the body axis and perpendicular to the plate, deg or radians (see fig. 1)
- wangular position of orifice row on moveable section of flat plate, deg (see fig. 1)
- S body cross-sectional area
- x distance from apex of body measured along axis of symmetry
- y distance of body nose apex from flat plate
- c_n section normal-force coefficient, Section normal force
- c_c section axial-force coefficient, Section axial force 2qR
- C_N body normal-force coefficient (positive toward plate),

 <u>Body normal force</u>

 qS_{max}
- c_{c} body-pressure axial-force coefficient (positive toward base of body), $\frac{\text{Body axial force}}{\text{qS}_{\text{max}}}$
- C_{m} body pitching-moment coefficient (about center of volume, x/L = 0.598), $\frac{Body \ pitching \ moment}{qS_{max}L}$

Subscript:

max maximum

DESCRIPTION OF MODEL AND TESTS

A perspective view of the test setup is shown in figure 1, and a photograph of the model mounted in the tunnel is presented in figure 2.

The model was a parabolic body of revolution with an overall fineness ratio of 10. The base of the model was cut off bluntly at a distance of 15 inches from the apex, with a resulting reduction in fineness ratio from 10 to 8. The body was equipped with two rows of 0.043 inch (inside diameter) static-pressure orifices located 180° apart. Each row contained 30 orifices. Provision was made in the model sting for rolling the body about its own axis so that complete pressure coverage could be obtained. The boundary-layer bypass plate, which served as the reflection plane for these tests, was mounted off of the tunnel side wall. Pressure measurements were obtained from a row of orifices located on a moveable section of the plate.

Pressure measurements on the body and on the plate were obtained for several different locations of the model with respect to the plate, from a distance of 0.8 body diameter to that corresponding to free-stream conditions. The body-plate separation distances are given in table 1. The y-coordinate represents the distance, in inches, of the body nose apex from the plate. The term $\frac{2\beta y}{L(1-\epsilon\beta)} \quad \text{is a nondimensional form of this separation distance.} \quad \text{In referring to figure 3 it may be noted that, for a value of } \frac{2\beta y}{L(1-\epsilon\beta)} = 1.0, \text{ the reflected nose Mach wave passes through}$ the center line of the model base, regardless of Mach number or incidence angle. For values of $\frac{2\beta y}{L(1-\epsilon\beta)} < 1.0, \text{ the reflected Mach wave intersects}$ the body center line forward of the base.

Tests were made for model incidence angles of 0° and ±3° with respect to the plate, at Mach numbers of 1.41 and 2.01, and at a Reynolds number, based on body length, of 4.54 x 10°. The test procedure consisted of setting the model roll angle and plate-orifice row angle and obtaining data for the specified body-plate separation distances and body incidence angles. The model roll angle and plate-orifice row angle were then changed and the tests repeated. It should be noted that the major portion of the interference-free data obtained at a Mach number of 1.41 was affected by a disturbance from the leading edge of the bypass plate. Therefore, the interference-free force characteristics which are presented at a Mach number of 1.41 are estimated values based on corrected loading curves. The body characteristics were not influenced by this disturbance at any other separation distance for either Mach number.

A limited amount of data were also obtained with roughness (carbo-rundum grains (No. 60)) added to the leading edge of the bypass plate and to the model nose. At the test Reynolds number, however, no effect of roughness was noted on the body or plate pressures.

Tunnel stagnation conditions were as follows: temperature, 100° F; dewpoint, approximately -35° F; and pressure, 12.2 pounds per square inch absolute at M = 1.41 and 14.7 pounds per square inch absolute at M = 2.01.

THEORETICAL CONSIDERATIONS

At supersonic speeds the prediction of the aerodynamic characteristics of a body (identified as the primary body in the discussion that follows) in the vicinity of a reflection plane resolves itself into the problem of determining the characteristics of this primary body when immersed in the flow field of an identical interfering body. The theoretical results presented in this paper have been obtained from an adaptation of slender-body theory as developed by Moskowitz (ref. 1) and also from an analysis based on simple buoyancy considerations. In essence, both methods are similar, although the boundary condition of no flow through the body is not satisfied in the buoyancy analysis.

In the method outlined by Moskowitz, the lift and moment (about the nose) of the primary body are given by the equations

Lift =
$$2qS_2\left(\epsilon + \frac{\vec{v}_2}{v}\right) + \frac{2\pi q}{v} \int_{x_1}^{x_2} R^2\left(\frac{\partial \vec{v}}{\partial x}\right) dx$$
 (1)

Moment =
$$-\frac{4\pi q}{V} \int_{x_1}^{x_2} \left[(V_{\varepsilon} + \overline{v}) R \frac{dR}{dx} + R^2 \frac{\partial \overline{v}}{\partial x} \right] x dx$$
 (2)

where the subscripts 1 and 2 refer to conditions at the apex and base of the primary body, respectively, and the term $\partial \bar{\mathbf{v}}/\partial \mathbf{x}$ is evaluated along the center line of the primary body. The upwash $\bar{\mathbf{v}}$ generated by the interfering body was determined by the method of reference 2 and is given by the equations

$$\bar{v}_{\epsilon=0} = \frac{0.02\text{VL}}{\text{r}} \left\{ 4.8\beta^2 \frac{\text{r}^2}{\text{L}^2} \left(1 - 1.6 \frac{\text{x}}{\text{L}} \right) \cosh^{-1} \frac{\text{x}}{\beta \text{r}} + \sqrt{\frac{\text{x}^2}{\text{L}^2}} - \beta^2 \frac{\text{r}^2}{\text{L}^2} \left[2.56 \frac{\text{x}^2}{\text{L}^2} - \frac{\text{x}^2}{\text{L}^2} \right] \right\}$$

$$4.8 \frac{\text{x}}{\text{L}} + 2 + 5.12\beta^2 \frac{\text{r}^2}{\text{L}^2}$$

$$(3)$$

$$\bar{v}_{\epsilon \neq 0} = -\frac{0.025L^{2}V\epsilon}{r^{2}} \left\{ 1.6\beta^{2} \frac{r^{2}}{L^{2}} \left[3.84 \frac{x^{2}}{L^{2}} - 4.8 \frac{x}{L} + 1 + 2.88\beta^{2} \frac{r^{2}}{L^{2}} \right] \cosh^{-1} \frac{x}{\beta r} + \sqrt{\frac{x^{2}}{L^{2}} - \beta^{2} \frac{r^{2}}{L^{2}}} \left[1.024 \frac{x^{3}}{L^{3}} - 2.56 \frac{x^{2}}{L^{2}} + 1.6 \frac{x}{L} \left(1 - 7.36 \beta^{2} \frac{r^{2}}{L^{2}} \right) + 10.24\beta^{2} \frac{r^{2}}{L^{2}} \right] \right\}$$
(4)

In the buoyancy calculations, the pressure distribution throughout the flow field of the interfering body was determined by slender-body theory (refs. 2 and 3). The primary body was then superimposed in this field and the additional pressures at the body surface due to the interfering flow field were used to determine the interference increments in normal force, chord force, and pitching moment. The pressure coefficient at any point in the flow field of the interfering body is given by the equation

$$P = 0.064 \left\{ \left[4.8 \frac{x^{2}}{L^{2}} - 6 \frac{x}{L} + 1.25 + 2.4 \beta^{2} \frac{r^{2}}{L^{2}} \right] \cosh^{-1} \frac{x}{\beta r} + \sqrt{\frac{x^{2}}{L^{2}}} - \beta^{2} \frac{r^{2}}{L^{2}} \left[6 - 7.2 \frac{x}{L} \right] \right\} - \frac{1}{V^{2}} \left(\frac{\partial \varphi}{\partial r} \right)^{2} + 4\alpha \left(\frac{R}{r} \right) \cos \theta \frac{dR}{dx} - \alpha^{2} \left[\left(1 - \frac{R^{2}}{r^{2}} \right)^{2} \cos^{2} \theta + \left(1 + \frac{R^{2}}{r^{2}} \right)^{2} \sin^{2} \theta \right] + \alpha^{2}$$
(5)

where

$$\frac{\partial \varphi}{\partial r} = \frac{0.02 \text{VL}}{r} \left\{ 4.8 \beta^2 \frac{r^2}{L^2} \left(1 - 1.6 \frac{x}{L} \right) \cosh^{-1} \frac{x}{\beta r} + \sqrt{\frac{x^2}{L^2} - \beta^2 \frac{r^2}{L^2}} \left[2.56 \frac{x^2}{L^2} - 4.8 \frac{x}{L} + 2 + 5.12 \beta^2 \frac{r^2}{L^2} \right] \right\}$$
(6)

For body incidence angles other than 0° , there is some question as to the orientation of the body axes and nose Mach waves with respect to the free-stream direction. This question arises because of the application,

at finite angles, of theoretical results derived on the basis of vanishing incidence angles. For the previous calculations it was assumed that the interfering body and its Mach wave were always alined with the airstream. (The flow field, however, was computed for the correct incidence angle.) In the buoyancy analysis the primary body was then superimposed in the flow at the designated incidence angle. In the application of the method outlined by Moskowitz, however, the primary body was alined with the airstream in order to simplify the calculations. The resulting changes in the force characteristics due to changes in the angular position of the primary body were found to be negligible.

7

The prediction of the variation in pressure on the reflection plane was obtained by slender-body theory (ref. 2). The velocity potential used in the expression for pressure coefficient was obtained by adding the potential of the interfering body to that of the primary body.

PRESENTATION AND DISCUSSION OF RESULTS

Body and Plate Pressures

Representative pressure distributions on the body and the plate are presented for a body incidence angle of 0° . A more thorough pressure-distribution analysis may be made from the data in tables 2 and 3. The accuracy in pressure coefficient is ± 0.01 .

The pressure distributions on the body at angular positions of maximum and minimum interference effects ($\theta = 0^{\circ}$ and 180°) are shown in figure 4 for different body-plate separation distances. For a separation

distance of $\frac{2\beta y}{L(1 - \epsilon \beta)} = 0.35$, the pressure distributions along the body

are presented in figure 5 for a range of body radial angles from 0° to 180° . The experimental results in each case are compared with theoretical pressure variations obtained from buoyancy considerations.

The predictions of the pressures on the side of the body nearest the plate are fairly good, although the magnitude of the pressure increase due to the reflected nose shock is underestimated in each case. On the far side of the body ($90^{\circ} \le \theta \le 270^{\circ}$) the experimental and theoretical variations are no longer similar. Since some flow separation would exist in this region because of induced velocities, the poor agreement might be anticipated.

The additional pressure increases which may be noted in the experimental variations at small body-plate separation distances (for example,

in fig. 5, M = 2.01, $\theta = 0^{\circ}$, and x/L = 0.5) are caused by multiple reflections between the body and the plate.

The pressure distributions on the center line of the moveable section of the reflection plane ($\psi=0^{\circ}$) are presented in figure 6 for the different body-plate separation distances. A more complete distribution of plate pressures is presented in figure 7 for a separation distance of $\frac{2\beta y}{L(1-\epsilon\beta)}=0.35.$ The results are compared with slender-body theory.

In general, the agreement between theoretical and experimental results is very good. In each case, however, the intersection of the nose shock with the plate occurs forward of the point indicated by slender-body theory. In an attempt to predict the location of this intersection point with greater accuracy, the body was replaced with a cone of equal apex angle, and the intersection point of the shock wave from the cone was determined by reference 4. The results which are indicated by the small arrow on the axis of each plot show very good agreement with the experimental data except for positions off of the plate center line. In this region, the data reflect the influence of a thickened boundary layer caused by a deviation of the flow from the center of the plate.

Body Normal-Force Distribution

The normal-force loading distributions over the body as a function of body station x/L are presented in figure 8. It should be noted from this figure that the normal-force loading curves are distorted over the forward portion of the body in the region from x/L = 0.2 to x/L = 0.5. This effect is more pronounced at a Mach number of 1.41 and 2.01. The reason for the existence of these negative increments in the values of section normal force is not known. This distortion of the loading curves will cause inaccuracies in the values of the overall body forces but will not significantly affect the incremental values due to body-plate interference.

The normal-force loading distributions at two representative bodyplate separation distances are compared in figure 9 with the results obtained from theoretical considerations. The loading curves obtained by the method of Moskowitz became infinite at the point of intersection of the Mach cone from the interfering body. The method of Moskowitz and the buoyancy technique both fail to give an accurate prediction of the experimental loading distribution over the body.

Body Coefficients

The changes in the values of the aerodynamic characteristics of the body due to interference between model and plate are presented in figure 10 as a function of body-plate separation distance. For a condition of no interference, the experimental values of the body characteristics are presented in the following table:

		M = 1.41	-	M = 2.01			
	€ = - 3 [°]	$\epsilon = 0^{\circ}$	€ = 3 [°]	€ = - 3°	$\epsilon = 0^{\circ}$	€ = 3°	
CC	0.072	0.068	0.073	0.083	0.079	0.083	
$^{\rm C}$ N	079	017	.053	095	004	.094	
C _m	049	.001	.043	045	001	.043	

As the body is moved into the region of the reflected nose shock the chord force decreases. Further movement of the body toward the plate, however, reverses this trend and the chord force increases rapidly as the separation distance becomes small. The initial drag reduction is due to the favorable slope of the after portion of the body. The reflected nose shock striking the boattailed section of the body causes an increase in pressure on this section and a decrease in overall drag. Although the flow between the body and the plate becomes complex for small separation distances, the effect of the reflected nose shock seems to predominate in determining the direction of the chord-force increments. In this case, the shock impinges on the forward portion of the model where the cross-sectional area is increasing and causes an increase in drag. The experimental chord-force increments are compared with the results obtained from buoyancy considerations, and the agreement is very good.

The interference increments in body normal force also exhibit a reversal in sign as the body is moved toward the plate. These increments are negative at first, and then become positive as the body-plate separation distance becomes small. Thus, a body in the vicinity of a reflection plane experiences a force toward the plate for small separation distances with a corresponding moment about the center of volume tending to move the nose away from the plate. As the separation distance becomes greater, the directions of these increments are reversed. The increments in pitching moment in this case are very small.

The trend and order of magnitude of the experimental increments in normal force are predicted very well by both the method of Moskowitz and by the buoyancy technique. The prediction of the increments in pitching moment about the center of volume, as might be expected, is not very good, although the method used by Moskowitz seems to give a more accurate indication of the experimental values than that obtained from simple buoyancy considerations.

It may be noted that the variations obtained from the buoyancy technique extend beyond a value of $\frac{2\beta y}{L(1-\epsilon\beta)}=1.0$. Although the reflected nose Mach wave passes through the center line of the model base at this separation distance, it intersects the body contour forward of this point. Therefore, the body is still subject to the action of the reflection plane at a separation distance of $\frac{2\beta y}{L(1-\epsilon\beta)}=1.0$.

CONCLUDING REMARKS

The changes in the aerodynamic characteristics of a blunt-based parabolic body of revolution with a fineness ratio of 8 have been determined at Mach numbers of 1.41 and 2.01 as the position of the body was varied with respect to a flat plate or reflection plane alined with the airstream. Data were obtained for body incidence angles of 0° and $^{\pm}3^{\circ}$ with respect to the plate and for a Reynolds number, based on body length, of $^{4}.54\times10^{\circ}$.

For small body-plate separation distances, the body was subject to positive increments in chord force. At greater separation distances (within the region of the reflected nose shock), these increments became negative, indicating regions of favorable interference. The prediction of the chord-force increments by buoyancy techniques was very good.

The variations of the increments in normal force and pitching moment were similar to those exhibited by the chord-force increments. For small separation distances, the body was subject to normal-force increments directed toward the plate and to pitching-moment increments tending to move the nose away from the plate. As the separation distance became greater, however, the directions of the normal-force and pitching-moment increments were reversed.

The trend and order of magnitude of the normal-force increments were predicted very well by both the method of Moskowitz and the buoyancy technique. The predictions of the pitching-moment variations, however, were poor.

Langley Aeronautical Laboratory,
National Advisory Committee for Aeronautics,
Langley Field, Va., October 19, 1954.

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TABLE 1.- BODY-PLATE SEPARATION DISTANCES

1						
€	$\epsilon = 0^{\circ}$		= 3°	€ = -3 [°]		
y, in.	$\frac{2\beta y}{L(1 - \epsilon \beta)}$	y, in.	$\frac{2\beta y}{L(1-\epsilon\beta)}$	y, in.	$\frac{2\beta y}{L(1 - \epsilon \beta)}$	
		M	= 1.41			
9.43 7.42 6.47 5.51 4.55 3.60 2.64 1.51	1.25 .983 .857 .730 .603 .477 .350	6.46 5.51 4.55 3.60 2.64 1.51	7.42 6.46 5.51 4.55 3.60 3.08	0.935 .814 .695 .573 .454 .388		
		M :	= 2.01			
16.36 4.23 3.69 3.14 2.60 2.05 1.51	3.80 .984 .858 .730 .605 .477	15.97 3.68 3.14 2.60 2.05 1.51	4.10 .941 .803 .665 .524 .368	16.74 5.19 4.64 4.10 3.55 3.08	3.57 1.105 .990 .873 .756 .655	

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY

$$M = 1.41$$

		€ = 0	•	$\frac{2\beta y}{L(1-\epsilon\beta)}$	-≈ .98		
X				θ			
T	0	15	30	45	60	75	90
.033 .067 .100 .133 .167 .200 .233	.130 .125 .103 .089 .071 .057	.118 .1092 .079 .061 .041	.128 .1099 .0079 .0051 .0047	.126 .112 .093 .078 .062 .048	.128 .115 .101 .083 .066 .052	.129 .117 .097 .082 .066 .054	.134 .118 .102 .083 .067 .054 .045
.300 .333 .367	.033	.024	.026	.025	.028	.027	.026

X	θ								
T	0	15	30	45	60	75	90		
.033 .067 .100 .133 .167 .200 .233 .267	.130 .125 .103 .089 .0757 .052	.118 .113 .092 .079 .061 .048	.122 .116 .098 .079 .063 .0551	.126 .112 .093 .078 .062 .048	.128 .115 .101 .083 .065 .055 .049	.129 .117 .097 .082 .066 .054	.134 .118 .102 .083 .067 .054 .045		
0037037037037037037037037037037037	033860 0011934 0011934 0001193	2 1 0 8 8 3 7 7 4 6 8 8 3 7 7 4 6 8 8 3 7 7 4 6 8 8 3 7 7 4 6 8 8 3 7 14 6 4 6 6 6 6 6 4 4 4 4 4 4 4 4 4 4 4	00000000000000000000000000000000000000	00001283374545355068707 00001283374555666665707 000000000000000000000000000	0219889000000000000000000000000000000000	022077-0022990-00555899-0066611-0030-0030-005560661-0030-005560661-0030-00560661-0030-005606060-005606060-00560661-005606060-005606060-005606060-005606060-005606060-005606060-005606060-005606060-005606060-005606060-005606060-005606060-005606060-00560606060	026 0018 0008 -0080 -024 -024 -0342 -0454 -0657 -0667 -0667 -0667 -0667		

X				θ			
L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200 .233	.122 .113 .106 .086 .070 .060	.122 .108 .096 .079 .060 .050	.119 .113 .103 .083 .066 .052	. 116 . 108 . 097 . 081 . 062 . 049	.119 .108 .100 .081 .065 .050	.118 .111 .099 .081 .064 .052	•117 •111 •099 •083 •064 •051
.33703370337033703370337033703370337	.027 .016 .004 .008 -018 -026 -036 -042 -042 -048 -056 -056 -057	.017 .008 .002 -005 -017 -026 -030 -030 -030 -046 -053 -065 -066 -059 -059	.024 .0110 .0100	.021 .014 -014 -029 -037 -0044 -029 -037 -0056 -066 -066 -066	.024 .018 .011 -002 -014 -023 -024 -036 -044 -054 -058 -067 -068 -067	.029 .019 .014 .000 .011 .022 .026 .034 .048 .049 .056 .066 .066	. 0 3 4 . 0 1 9 . 0 1 5 . 0 0 0 2 . 0 0 9 . 0 2 5 . 0 3 4 . 0 4 7 . 0 5 5 . 0 6 1 . 0 6 4 . 0 6 6 . 0 6 6
.900 .933 .967	056 050 035 .076	057 046 029 .007	032 024 023 017	036 026 026	041 028 026	039 023 021	037 025 018

X		θ								
L	0	15	30	45	60	75	90			
0 3 3 7 0 0 3 3 7 0 0 1 1 3 6 7 0 0 3 7 0 0 2 3 6 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	.131 .100 .0865 .0556	.124 .112 .098 .0058 .0056 .0054	.125 .111 .099 .077 .061 .051	.125 .110 .096 .078 .050 .052	.129 .114 .100 .0865 .054 .054	.132 .117 .100 .085 .0657 .057	.125 .111 .096 .081 .064			
3370 3370 3370 3370 3370 3370 3370 3370	032 03151 00154 00	0 2 8 0 2 4 0 1 4 7 - 0 0 1 8 - 0 2 4 - 0 2 4 - 0 4 5 - 0 4 5 - 0 6 2 5 - 0 3 3 2 - 0 3 2 - 0 3 4 - 0 6 2 5 - 0 3 3 2 - 0 3 4 - 0 3 4 - 0 6 2 5 - 0 6 2 5 - 0 3 4 - 0 6 2 5 - 0 6 - 0 6 2 5 - 0 6 - 0 6 2 5 - 0 6 2 5 - 0 6 - 0 6 2 5 - 0 6 2 5 - 0 6	0 2 8 8 2 0 15 7 - 0 0 12 5 5 - 0 0 12 5 5 - 0 0 12 5 5 - 0 0 12 5 5 7 5 3 6 6 9 7 - 0 0 5 3 5 6 6 7 0 0 3 3 3 6 9 7 0 0 3 3 4 5	.027 .0217 -0098 -018 -0363 -044 -0560 -0447 -0560 -0376 -0376 -0376	.028 .029 .009 0015 0222 0417 043 0554 0555 0339 0338	.028 .024 .011 007 019 022 043 0445 046 054 054 054 037 0335	0 27 0 0 12 0 0 12 2 0 0 0 12 2 0 0 0 12 2 0 0 0 12 2 0 0 0 12 2 0 0 0 12 2 0 0 0 12 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			

.052 -.007 -.002 -.003 -.017 -.002 -.013

€ = 0°

 $\frac{2\beta y}{L(1-\epsilon\beta)} = .86$

X				θ			
L	180	165	150	135	120	105	90
.033 .067 .1033 .1367 .200	.118 .108 .097 .080 .065 .052	.119 .111 .096 .081 .061 .049	. 122 . 112 . 101 . 082 . 065 . 051	.119 .111 .099 .082 .067 .052	.118 .110 .100 .082 .064 .051	.121 .113 .1085 .070 .057	115 108 0980 061 051
23337037037037037 2446036036036036036036036036036036036036036	.025 .016 .015 .001 -012 -022 -030 -045 -045 -060 -066 -066	.025 .017 .009 -0031 -0217 -0247 -0344 -048 -0555 -0661 -0658 -059	. 0 2 6 . 0 1 9 . 0 1 4 - 0 0 1 1 - 0 1 4 - 0 2 5 - 0 2 9 - 0 3 8 - 0 4 9 - 0 5 7 - 0 6 7 - 0 6 6 1 - 0 6 5 3	.026 .020 .014 .001 -012 -022 -0228 -035 -0435 -0550 -0553 -064 -0661	.028 .020 .015 .0011 -021 -024 -0344 -0447 -050 -061 -061 -0637	.032 .023 .016 .004 -007 019 025 033 046 052 059 061 061	0 301 0 021 0 010 0 011 0 012 0 028 0 042 0 042 0 047 0 063 0 063 063 0 063 0
.900 .933 .967	041 027 016 .078	039 027 015	029 023 023 009	029 022 022	037 027 021	032 026 013	038 028 014

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$M = 1.41$$

00	$\frac{2\beta y}{1}$ = .73	
e = 0°	$L(1-\epsilon\beta)$ = .73	

Y	θ								
Ê	0	15	30.	45	60	75	90		
.033 .067 .1033 .167 .200	1325 1004 0990 0074 0060 0053	129 1104 1084 1070 1065 1055	.124 .115 .101 .084 .068 .062	.121 .115 .094 .079 .068 .058	.128 .119 .096 .081 .074 .062	.130 .121 .097 .083 .063 .050	.128 .117 .099 .080 .073 .060		
0037037037037037037037037037037037037037	036 0319 0014 0024 1024 10038 10039 10033 10036 10044 1055 10444 1055 1049	353044190419891174046 	.029 .0210 -0020 -0020 -0036 -0042 -0051 -0031 -0031 -0031 -0040 -0053 -0040 -0053	.026 .018 .0099 -018 -025 -038 -045 -045 -026 -038 -045 -025 -025 -038 -025 -025 -025 -025 -025 -025 -025 -025	030 0233 0010 -0019 -0025 -0344 -0040 -0044 -0020 -0044 -0044 -0044 -0044 -0044 -0044 -0044	.028 .029 .029 .019 .029 .029 .047 .0443 .0443 .0348 .0348 .0348 .0444 .0348 .0444 .0446	0 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		

x				θ			
X L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.120 .111 .103 .083 .068 .058	.128 .117 .109 .069 .055	.117 .1111 .103 .082 .064 .053	.118 .108 .098 .099 .061 .052	.118 .110 .101 .082 .068 .053	.117 .106 .100 .080 .069 .054	.119 .112 .100 .082 .073 .057
20370370370370370370370370370370370370370	. 0 31 . 0 22 5 . 0 10 3 . 0 10 3 . 0 13 6 . 0 24 4 . 0 35 9 . 0 42 9 . 0 55 6 . 0 55 2 . 0 39 3	.030 .024 .017 .0066 018 0322 0342 049 049 051 0496 0496	.028 .0205 .015 0014 023 0239 0350 0557 0650 0660	.028 .020 .014 .000 010 022 029 036 048 055 055 057 048	.031 .021 .014 .0011 021 022 034 043 055 055 045 049	.033 .015 .002 .0015 .002 .002 .002 .002 .002 .003 .004 .005 .005 .005 .005 .004 .004 .004	0 3 4 0 0 2 7 0 0 0 0 7 0 0 0 0 7 0 0 0 2 4 0 0 0 3 9 0 0 4 4 5 0 0 0 3 3 3 5 0 0 0 3 3 3 5 0 0 3 3 3 5
.867 .900 .933 .967	028 021 015	028 022 014 .009	031 026 022 014	032 024 016 017	036 027 016 .006	039 029 017	037 032 019

00	$2\beta y = 60$
€ = 0°	$\frac{2\beta y}{L(1-\epsilon\beta)} = .60$

× L .033 .067	0	15	30	1			
			30	45	60	75	90
.100 .133 .167 .200 .233	.133 .128 .111 .095 .075 .069 .060	1219 1107 1087 00745 0055	.124 .114 .103 .080 .070 .0559 .059	. 122 . 109 . 110 . 075 . 067 . 058 . 044	.125 .113 .113 .078 .070 .057	.128 .112 .109 .081 .071 .058	.11 .098 .087 .060
0037037037037037037037037 33344340360360360360360 44555666677788889990	033 0314 -0019 -0019 -0019 -0019 -0003 -0019 -0019 -0019 -0019 -005 -005 -005 -005 -005 -005 -005 -00	.034 .0276 .016 .0015 .0015 .0015 .0015 .0015 .0018 .0034 .0034 .0039 .0049 .00667 .00667	.029 .029 .029 .029 .0105 .0115 .0013 .001	.026 .021 .0016 .0017 .0030 .0117 .00317 .0014 .026 .0014 .025 .045 .045 .045 .046 .046 .046 .046 .046 .046 .046 .046	.025 .0203 .0016 .0016 .0016 .0016 .0016 .0016 .0016 .0016 .0015 .0016 .0025 .0039 .0049 .0055 .0056 .0056 .0066	.027 .0205 .0109 .0119 .0313 .016 .0114 .0122 .0222 .0225 .0377 .045 .0547 .0547 .0631	000100010001000010000000000000000000000

Ť	180	T					
	100	165	150	135	120	105	90
.0337 .067 .1033 .167 .200	.121 .110 .100 .083 .058	.126 .1153 .103 .087 .057	.111 .1112 .085 .053 .048	.117 .107 .100 .085 .065 .054	.114 .103 .099 .082 .063 .053	.117 .106 .103 .086 .064 .056	.118 .108 .108 .065
26037037037037037037 446037037037037037037037037037037037037037	03261 02261 00265 00065 00169 00289 004435 004435 00435 00435 00435 003333	032697 000074520052000745200520007452005200074520052000745200520007500075	.030 .023 .015 .001 -011 -024 -029 -039 -047 -044 -043 -044 -043 -044 -042 -042	0 2 9 9 0 0 2 1 4 4 1 0 0 0 0 2 1 4 1 0 1 0 1 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	.028 .02123 00144 00329 00344 00338 00442 00338 00445 00454 0045	0 3 4 4 0 16 3 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	0.0100000000000000000000000000000000000

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued.

$$M = 1.41$$

X				θ			7,511
L	0	15	30	45	60	75	90
.033 .067 .100 .133 .167 .200 .2367 .2367	. 127 . 126 . 106 . 090 . 077 . 058	.128 .122 .106 .086 .076 .062 .057	.121 .117 .104 .083 .072 .058	.122 .113 .099 .080 .070 .056	.124 .116 .098 .081 .071 .052	.129 .117 .099 .086 .071 .054	.123 .115 .096 .081 .068 .054
337033703370337033703370337033703370337	034 035 065 065 032 021 0014 -0014 -002 -0014 -005 -005 -005 -005 -005 -005 -005 -00	0336 00610 00610 00328 00188 -0017 -00279 -00473 -00674 -00812 -00812	.030 .0233 .0246 .0246 .02132 .0013	027 0288 0343 00723 -0027 -0027 -0027 -0050 -0050 -006	.028 .020 .020 .026 .0018 .0018 .0019 .0017 .0027 .037 .037 .057 .057 .063 .073 .073	02279652774844825666938666938	. 0 2 5 . 0 18 . 0 0 18 . 0 0 0 18 . 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

X				θ			
L	180	165	150	135	120	105	90
.033 .067 .1003 .157 .2033	.118 .112 .101 .084 .067 .059	.126 .116 .101 .087 .070 .056	.121 .115 .105 .086 .070 .057	. 115 . 108 . 098 . 080 . 062 . 051	.118 .1104 .085 .067	.119 .108 .103 .067 .056	.116 .111 .100 .083 .0655
.337033703370337033703370337033703370337	.031 .0823 .0088 -0019 -0019 -0024 -0024 -0023 -0027 -0037 -0040 -0040	.036 .028 .018 .004 -005 -017 -022 -022 -025 -025 -023 -0331 -037 -037	.034 .026 .027 .0107 .016 .017 .018 .024 .027 .039 .039 .039 .042 .043	.026 .018 .012 -012 -014 -024 -022 -0330 -0336 -045 -045 -046 -047	.032 .024 .015 .002 .0017 .017 .017 .016 .019 .024 .029 .033 .036 .034 .048	.035 .026 .019 .003 007 007 008 017 022 031 038 040 040	.032 .019 .014 -002 -010 .001 -006 -020 -032 -048 -054 -055
.900 .933 .967	048 046 041 .030	044 044 040 015	048 047 040 029	051 049 042 018	054 053 040	055 052 029	063 060 028

X		Silver Fill		θ			
L	0	15	30	45	60	75	90
.033 .067 .100 .133 .167 .200 .233 .267	137 131 109 097 079 070 061	.1229 .1266 .0975 .0066 .0057	11225 11205 1087 1087 1085 1085 1085 1085 1085 1085 1085 1085	.122 .1113 .097 .084 .0657 .048	.121 .114 .095 .083 .0666 .046	111974 10084 100558 10045	.125 .120 .101 .084 .057
.3370037003700370037 .4450337003700370037 .5566603600370037	091 082 0633 00433 00316 001337 001337 00677 00670 00999 009999	0 9 4 9 0 0 6 1 1 1 1 0 0 2 3 1 4 7 1 1 1 0 0 2 3 1 4 7 1 1 1 1 0 0 2 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	0948 005778 0015263 0015263 00163 00	0803310005380000000000000000000000000000	.074 .068 .050 .028 .011 .0036 0128 028 038 055 064 078 083 083 083 094 094	.060 .0546 .0246 .0281 .0022 -0092 -00924 -0449 -0473 -0613 -077 -0888 -0888 -0888	.05142 .002642 .002105 .00047 0016262 00647 00654 00778

€ = 0°

 $\frac{2\beta y}{L(1-\epsilon\beta)} = .35$

X				θ			
L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.122 .116 .104 .088 .076 .063	.128 .1103 .089 .072 .058	.1215 .1085 .0859 .0554	.117 .107 .097 .082 .067 .054	.117 .1099 .099 .080 .066	.1119 .1109 8 8 .005 5 .005 2	.121 .113 .102 .085 .067
337037037037037 446036036036036036036036036036036036036036	.037 .029 .025 .025 .015 .007 -004 -018 -025 -036 -040 -040 -055	.037 .0233 .019 .016 .008 .005 0013 016 022 022 023 043 043	.0313 .024 .018 .010 .002 -004 -0121 -025 -025 -0333 -0344 -054 -054	.027 .018 .0115 .0014 .0007 0018 016 0224 0224 0224 0232 0416 0586 061	.029 .024 .029 .022 .011 002 005 009 021 029 032 045 054 063	.028 .030 .043 .030 .016 .004 .003 .0021 .021 .028 .033 .048 .058 .058	.030 .0444 .0484 .0352 .0111 -00133 -00339 -00663 -0774
.900 .933 .967	068 065 059 .014	064 063 054 025	067 064 063 037	067 061 057 021	074 067 052 011	078 065 039 005	084 069 041 004

TABLE 2. - PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$M = 1.41$$

 $\epsilon = 0^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .20$

X				θ			
X L	0	15	30	45	60	75	90
.033 .067 .100 .133 .167 .200	.142 .134 .116 .101 .149 .151 .140	.137 .126 .107 .092 .152 .148 .134	.128 .119 .103 .088 .141 .142	. 125 .114 .098 .082 .090 .127 .114	.123 .115 .097 .082 .075 .114 .105	.123 .194 .082 .067 .1099	.128 .116 .097 .084 .067
.3036703370037 .4460336703370037 .5560336703370337 .666670337	.113 .0953 .043 .016 .014 .014 .014 .004 .010 .010 .010 .010	10889 00304 00304 00306	.098558 .058558 .02851	0 0 8 8 0 7 8 8 0 7 8 8 0 7 8 8 0 7 8 8 0 7 8 8 0 7 8 9 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7	083 0751 0051 0081 -0016 -0016 -0017	0757 00541 00819 -0029 -00378 -00575 -00822 -10015 -10089 -110089 -11035 -11035	0 7 2 5 0 6 5 1 0 0 2 4 1 0 0 0 8 4 1 0 0 0 8 1 0 1 0 1 0 1 0 1 0 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1 1 1 1 0 1

<u>x</u>				θ			
T	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.127 .118 .108 .093 .077 .067	.128 .116 .104 .089 .073	.123 .118 .105 .090 .074 .065	.117 .107 .097 .082 .068 .055	.115 .107 .099 .080 .065 .063	.117 .1111 .097 .082 .067 .075	.118 .110 .102 .083 .076
	.067 .058 .051 .038 .024 .009 .001 007 018 029 041 049 057 070	.068 .0615 .038 .025 .014 .011 -0027 .018 -027 .033 -041 -055 -074 -073 -074	.058 .045 .045 .032 .019 .006 .0027 -038 -043 -060 -073 -083 -083 -083	.059 .0552 .0337 .004 .0000 031 045 055 067 079 089 089	.068 .057 .062 .0320 .0062 .0032 .0062 .0015 .00	. 078 . 068 . 068 . 039 . 0205 . 0018 . 0052 . 0052 . 0061 . 0099 . 0099 . 0099 . 0099	
.933	078 077 .036	076 071	088 077	087 074	086	087 054	084 047

9

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued.

$$M = 1.41$$

$\epsilon = 3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .90$			
€=3P) _ 90	-0 2	RV	
	€=3	9	0

X				θ			
L	0	15	30	45	60	75	90
.033 .067 .100 .133 .167 .200 .2333	.100 .094 .069 .057 .031 .031	.091 .0867 .0538 .0332 .0331	.104 .090 .077 .059 .044 .036	.100 .089 .075 .058 .040 .032	.105 .092 .077 .061 .044 .036	.112 .100 .082 .068 .050 .040	.127 .115 .096 .082 .0631 .052
336037037037037037 445036036037037 666036037037	010 0008 -0008 -0037 -0027 -0037 -0030 -0049 -0051 -0057 -0057 -0057 -0057 -0057 -0057	010011707170114744900396 000033445055550000000000000000000000000	01410056889960611320000334	95669330079833364443708	.0107 00202 00337 0045 00537 0045 00537 0045 00537 0	01083352526 -000233252526 -000233252526 -000233252526 -0006627 -0006627 -000536 -0006627 -000334	024 00166 -0012466 -002265 -00249 -0049 -00550 -00557 -00557 -00557
1.000	.013	.010	.011	.011	.017	.016	.009

X	0.00			θ			
L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	. 155 . 147 . 135 . 115 . 097 . 081	.156 .145 .134 .115 .096 .081	.150 .144 .136 .114 .095 .081	.139 .135 .123 .101 .085 .071	.127 .121 .113 .090 .076 .062	.118 .116 .107 .082 .068 .055	.114 .108 .096 .080 .063
23370370370370370370370370370370370370370	. 057 . 043 . 036 . 020 . 004 - 005 - 011 - 022 - 031 - 044 - 049 - 064 - 069 - 069 - 067	.047 .037 .019 .006 -006 -0012 -023 -032 -034 -049 -065 -065 -066 -070	.051 .039 .035 .017 .006 007 014 023 034 041 064 065 065 0665	.040 .0315 .0111 .0025 .0114 .0019 .019 .0366 .0366 .0366 .0664 .0666	.036 .028 .020 .006 018 023 034 048 057 066 069	.028 .023 .013 .010 -011 -021 -022 -037 -044 -054 -056 -069 -068 -069	0 30 0 0 80 0 0 10 0 0 10 0 0 20 0 10 0 1
.900 .933 .967	073 067 056 003	074 066 046 002	070 058 042 004	064 048 037	056 045 031	042 036 021 001	031 026 013

€=3°	2βy 77	
	$\frac{2\beta y}{L(1-\epsilon\beta)}$ = .77	

X				θ			
L	0	15	30	45	60	75	90
.033 .067 .100 .133 .167 .200 .233 .267	.096 .091 .071 .059 .044 .039	.092 .080 .063 .049 .036 .026	.097 .087 .071 .058 .047 .041	.098 .086 .070 .054 .045 .039	.104 .094 .076 .066 .055 .0433	.113 .102 .086 .069 .069 .048	.125 .115 .097 .082 .065 .058
3367033703370337033703370337033703370337	.013 -0014 -0028 -0344 -0344 -047 -047 -047 -048 -032 -032 -033 -035 -035 -035 -035 -035 -035 -035	.009 -0002 -0002 -0034 -00347 -0054 -0051 -0025 -00326 -00339 -003365	.0137 0017 0178 03128 0342 046 050 049 0215 028 028 030 0330 0331	. 0 1 0 6 - 0 0 1 4 2 - 0 0 2 9 - 0 0 3 4 2 - 0 0 4 2 - 0 0 3 0 5 0 - 0 0 2 3 3 3 - 0 0 3 0 4 0 - 0 0 3 0 3 4 - 0 0 4 0 0 3 0 4 0 0 0 3 0 0 3 0 0 0 3 0 0 0 3 0 0 0 0	0138 -00033 -00187 -00217 -00317 -00401 -004	.019 .0129 .0019 -0017 -0028 -0038 -0041 -0051 -0051 -0056 -0035 -0039 -0039 -0039 -0039	028830000000000000000000000000000000000

X				θ			
L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200 .233	.155 .145 .136 .114 .095 .083	.155 .147 .134 .113 .094 .080	• 147 • 145 • 133 • 110 • 094 • 078 • 072	. 137 .132 .122 .101 .084 .070	.127 .125 .114 .092 .079 .069	.116 .1103 .082 .071 .056	.111 .103 .095 .076 .067
037037037037037 0360360360360360360360360360360360360360	.050 .040 .035 .021 .006 -007 -014 -031 -039 -043 -065 -065 -071 -066 -071	.048 .039 .039 .004 008 026 026 035 041 069 072 072	. 0 5 1 . 0 4 2 6 . 0 3 8 . 0 1 8 . 0 0 9 . 0 0 9 . 0 0 2 5 . 0 0 2 5 . 0 0 4 2 . 0 0 4 2 . 0 0 5 3 . 0 0 6 3 . 0 0 6 7	.044 .030 .026 .010 .002 -0023 -023 -029 -046 -050 -061 -069	.041 .031 .023 .007 004 015 032 032 047 063 063 064	.033 .022 .016 .002 -011 020 036 052 052 052 064 066 054	.0319 .01191 .00122 -0229 -03667 -0507 -0507 -05375
.900 .933 .967	055 049 044 .016	057 051 041 004	051 044 034 003	051 043 035	045 037 028 .007	043 034 026	036 029 015

€ = 3°

0	2βy	64
,	$\frac{2\beta y}{L(1-\epsilon\beta)} =$.04

X		θ									
T	0	15	30	45	60	75	90				
.033 .067 .1033 .167 .200 .233 .260	96 0990 0069 0059 00443 0035	.088 .089 .051 .043 .034 .027	.093 .084 .077 .052 .044 .034	. 130 .124 .116 .093 .083 .071	.104 .094 .091 .063 .054 .040	.114 .105 .103 .069 .064 .050	125 1109 097 0067 0054 0047				
37037037037037037 336036036036036036 35344455556667778888999	0132 00102611320227 000033277 00003327 00003327 00003338 0004443 004443 00446	000023197010887 	.010 -0004 -0027 -0230 -0339 -0173 -0173 -0133 -0345 -0345 -0444 -045 -0447 -0444	.0463047047000470000470000470000047000000000	.014 -0033 -0024 -0359 -0318 -017 -0328 -038 -042 -042 -044 -049 -049	.0213 .00132 .00155 .00155 .00354 .00337 .00123 .00335 .00445 .00445 .0051	028 0183 00139 00119 00119 0033568 00119 003344 003344 004467 004467 0044926				

X				θ			
T	180	165	150	135	120	105	90
.0357 .1000 .1337 .2003	153 1144 1135 1196 0082	154 1148 1135 1082	.143 .140 .131 .110 .093 .078	.170 .169 .157 .139 .126	125 1123 1113 0979 065 0056	.121 .116 .109 .088 .075 .062	.110 .100 .080 .065
2333444455556667777888	.051 .041 .033 .020 .007 -006 -016 -026 -032 -041 -046 -054 -054 -056 -056	053 0043 00106 00057 -00057 -000440 -00554 -00554 -00554 -00564 -	049 0383 01073 01073 -0109 -0285 -0044 -0044 -0054 -0054 -0054 -0054 -0044	078 0657 0433 0803 0803 00043 -00103 -00118 -00115 -00149 -0010	.038 .0250 .0050 .0058 020 027 034 049 0549 0544 049	. 0377 . 0279 . 0005 - 0006 - 0217 - 0377 - 0473 - 0473 - 0440 - 0440 - 0443 - 045	00118 001015 000124 0000124 0000124 0000124 0000124 0000124 0000124 0000000000
.900 .933 .967	051 049 049	054 050 046 022	048 048 044 014	064 060 057 016	048 045 037	045 041 029	039 035 022

€ = 3°	2 <i>β</i> y _	50
€=3	$\frac{\Box \beta y}{\Box (1-\epsilon \beta)} =$.50

¥	θ								
X.	0	15	30	45	60	75	90		
.033 .067 .100 .133 .167 .203 .267	.114 .099 .077 .062 .049 .042	.097 .082 .0753 .0432 .032	.094 .086 .078 .059 .047 .037	.098 .088 .073 .059 .047 .036 .033	.108 .093 .079 .061 .051 .040	.116 .102 .086 .071 .059 .046 .039	. 123 . 110 . 096 . 082 . 068 . 054 . 048		
03360370370370370370370370370370370370370370	016 016 0010 001 0000 0000 0009 -0019 -0019 -0034 -0034 -0040 -0050 -0050 -0050 -0050	.010 .0035 .005 .008 002 010 023 0319 050 058 061 061 061	111262141021410215151645 001001000110234103355645 00100110234103555645	.012 .0004 .0004 .0017 .00006 .0012 .0020	.0147 .00063 .000185 .000185 .00196	.0192 -00122 -00144 -00122 -00078 -00	0 2 16 2 1 1 2 2 0 0 7 6 2 1 6 2 1 1 2 2 0 0 7 6 2 1 2 1 2 0 0 7 6 2 5 3 7 7 7 3 7 0 0 0 0 5 5 5 5 6 7 7 3 7 0 0 0 0 5 5 5 5 6 7 7 3 7 0 0 0 0 5 5 5 5 6 7 7 3 7 0 0 0 0 5 5 5 5 6 7 7 3 7 0 0 0 0 5 6 5 6 7 6 7 6 7 6 7 6 7 6 7 6 7 6 7 6		

<u>x</u> .				θ			
Ê	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.158 .150 .140 .120 .102 .088	153 1145 1135 1195 082	.148 .150 .136 .111 .096 .083	.134 .135 .122 .102 .086 .071	.126 .124 .113 .093 .077 .065	.119 .120 .110 .088 .073 .060	112 106 106 083 067 055
23334444555566677778888	.059 .048 .040 .025 .012 .0014 021 029 035 037 036 046 046	.051 .044 .036 .021 .006 004 013 035 035 033 046 048 048	.053 .045 .036 .021 .005 014 030 030 034 032 042 044 044	.045 .034 .025 .013 -0002 -016 -026 -028 -025 -030 -034 -045 -045 -047 -049	0 3 6 0 2 5 0 1 8 0 0 5 5 - 0 0 8 - 0 2 2 5 - 0 2 2 5 - 0 2 2 5 - 0 2 3 0 - 0 0 0 - 0 0 - 0 0 0 - 0 0 - 0 0 - 0 0 0 - 0 0 - 0 0 - 0 0 - 0 0 -	.036 .023 .018 .002 -012 -024 -024 -014 -014 -018 -033 -033 -035 -055 -055	0 34 0 28 0 0 12 0 0 12 0 0 0 22 0 0 0 22 0 0 0 0 9 0 0 0 22 0 0 0 22 0 0 0 40 0 0 40 0 0 48 0 0 48
.900 .933 .967	057 057 058 005	060 060 056 032	058 058 055 019	062 060 056 004	059 058 048	057 052 031 .016	056 052 012 019

NACA RM L54J29

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued.

$$M = 1.41$$

 $\epsilon = 3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .37$

X	θ									
T	0	15	30	45	60	75	90			
.033 .067 .100 .133 .167 .200 .233 .267	.108 .099 .077 .063 .050 .043 .039	0989 00759 0049 00334 0035	.099 .088 .073 .062 .047 .039	.099 .091 .078 .063 .045 .037	.107 .099 .078 .067 .050 .042 .035	.1102 .081 .069 .052 .045	.120 .111 .088 .076 .060			
3337 44337 44337 55337 66337 67337 67337 67337 67337 67337 67337 67337 67337 67337 67337	06530066718880243888755666644665	004317663130005667332839 	.0610 .06403 .023639 .00039 .0003539 .000351 .000351 .0066666666666666666666666666666666666	.058 .038 .037 .0017 .0018 .0019 .00	.045 .058 .046 .025 .001 .012 .0014 .012 .013 .014 .014 .014 .014 .014 .014 .014 .014	.023 .0442 .023 .0066 -015 -027 -027 -030 -044 -054 -0766 -0776 -081	0 2 3 3 3 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4			

×				θ			
Ê	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	• 159 • 159 • 139 • 119 • 103 • 089 • 080	.158 .150 .139 .121 .101 .086	.152 .150 .135 .114 .096 .083	.137 .134 .124 .102 .088 .073	.129 .129 .116 .095 .081 .066	.119 .1165 .086 .072 .060	•111 •107 •099 •079 •066 •053
2337033703370337033703370337	0 5 8 5 8 5 8 6 9 4 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1	.055 .0439 .036 .0267 .0106 .0065 .0217 .0211 .0253 .0413 .0485 .058	.055 .042 .0336 .0235 .015 .006 .0039 -014 -020 -0328 -0413 -0512	.048 .031 .027 .016 .012 .004 .008 .009 .008 .009 .008 .009 .008 .008	.039 .028 .024 .016 .006 .005 020 020 023 043 043 060	.030 .024 .025 .016 .007 .001 .008 .007 .008 .007 .008 .007 .008 .007 .008 .007 .008 .007 .009 .009 .009 .009 .009 .009 .009	.029 .016 .032 .032 .001 .007 004 023 029 046 064 064
.900 .933 .967	065 070 071 017	072 075 075	069 071 067 028	073 067 063 009	074 074 054 007	077 073 038 006	074 066 018 003

 $\epsilon = 3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .21$

X				θ			
X L	0	15	30	45	60	75	90
.033 .067 .100 .133 .167 .200 .233	.111 .101 .080 .067 .093 .105 .096	.098 .089 .076 .059 .093 .105	.096 .083 .068 .059 .103 .098	.100 .089 .077 .063 .049 .088	.104 .094 .076 .065 .050 .085	.117 .105 .091 .077 .061 .083	.124 .109 .097 .065 .084
303370337033703370337033703370337033703	.070 .057 .01066 .029 .029 .0461 .087 .087 .087 .087 .087 .087 .087	. 0 6 2 . 0 4 7 9 . 0 2 7 9 . 0 0 1 6 . 0 0 3 1 . 0 0 5 6 . 0 0 7 5 . 0 0 7 9 . 0 0 9 0 . 0 0 8 0 . 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	.0602.00127.	.0699.0336.0140.0100.0302.0302.0302.0044.00688.0079.0096.00997.0099.0099.0099.0099.009	.066 .088 .040 .0155 017 028 039 065 067 087 098 099 099 099 099	.066 .0647 .0173 .0173 .0058 .0189 .0297 .0477 .0567 .0798 .0998 .0998 .0998 .0998	.06596 .004696 .0020564 .00205

X				θ			
L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.161 .153 .142 .125 .108 .091	.161 .150 .141 .122 .105 .087	.154 .148 .139 .1102 .087	.140 .136 .124 .102 .091 .075	.127 .124 .112 .094 .081 .067	.123 .117 .109 .090 .079 .067	.1105 .105 .097 .081 .070
26036033703370337033703370337033703370337	.075 .070 .062 .046 .032 .021 .0012 0019 019 035 043 050 066 075	.071110 .06555 .0012121 .00134	.077 .0695 .0506 .0316 .014 .0027 0207 0399 0457 0712 0712	.069 .0514 .038 .025 .011 .0002 -019 -0318 -0467 -0567 -0807 -0807	.069 .057 .050 .037 .023 .009 .002 -011 -022 -034 -048 -063 -076 -087 -087 -089	.071 .0556 .039 .024 .010 .004 007 023 0346 049 069 069 087 087	0 6926 0 0 5 5 6 2 6 2 6 2 6 2 6 2 6 2 7 7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1.000	082	087 061	078	080	069	046	020

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$M = 1.41$$

 $\epsilon = -3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .94$

- 0

$$\frac{2\beta y}{L(1-\epsilon\beta)} = .45$$

<u>X</u>		θ										
L	0	15	30	45	60	75	90					
.033 .067 .100 .133 .167 .200 .233 .267	.160 .158 .138 .119 .102 .088 .079	.153 .146 .127 .110 .0978 .070	.156 .147 .126 .107 .0977 .0977	.149 .140 .121 .101 .085 .071	.136 .127 .109 .090 .073 .060	.1284 .0988 .0888 .0658 .00483	.120 .110 .094 .076 .057 .044					
3370370370370370370370370370370370370370	053771532252001233244557253200012334455725777	0 4 4 4 4 4 1 7 5 1 18 4 8 6 0 7 7 5 6 7 7 5 6 7 7 7 5 6 7 7 7 7 7 7 7	0042596444765400716 000064477657406716 00006471657165716	0 4 4 4 4 6 6 6 6 7 6 6 8 7 9 6 7 6 7 6 8 7 9 6 7 6 8 7 9 6 7 6 8 7 9 6 7 6 8 7 9 6 7 6 8 7 9 6 7 6 8 7 9 6 7 6 8 7 9 6 7 6 8 7 9 6 7 6 7 6 8 7 9 6 7 6 7 6 8 7 9 6 7 6 7 6 7 6 7 6 7 6 7 6 7 6 7 6 7	0 3 2 4 1 1 3 3 2 2 1 0 0 1 2 2 2 1 1 0 3 2 2 1 1 0 3 2 2 1 1 0 1 0 1 2 2 2 1 1 1 1 1 1 1 1 1	.028 .020 .008 0014 021 034 040 040 0539 0645 0703 0733 0734 0744 0444	.018 .0122 .001383 .00236 .00376 .0036 .00562 .00562 .00675 .0061 .0061					

X		θ										
	0	15	30	45	60	75	90					
.033 .067 .100 .133 .167 .200 .233 .267	.169 .158 .138 .126 .092 .083	.179 .160 .143 .120 .108 .093	.1557 .147 .132 .119 .0983 .077	.148 .134 .120 .098 .085 .072	.1445 .107 .093 .0743 .0055	.133 .1101 .088 .071 .0051	. 1 2 6 . 1 1 2 . 0 9 8 . 0 7 9 . 0 5 6 . 0 5 6					
35033703370337033703370350350350350350350350350350350350350350	057 057 060 038 047 032 0012 0012 0012 0014 0014 0014 0014 001	0567 01055 00559 0054644 0000046 0000787 009746 009746 009746 009746 009746 009746	.047 .040 .0746 .0312 .0060 .0010 .00217 .0064 .0088 .0097 .107	.038 .0361 .0634 .0634 .00059 .00059 .00057 .0083 .0083 .0097 .0097 .00994	.030 .0346 .03527 .0100 .0027 .0100 .0027 .0010 .0035 .0036 .0037 .0046 .0077 .0090 .0090 .0090	.0269 .00198 .0044 .0049 .00462 .0028 .0037 .00568 .00763 .00897 .00897 .00992	. 0 2 3 . 0 1 9 . 0 0 5 . 0 3 3 . 0 1 4 . 0 0 0 . 0 1 4 . 0 2 8 . 0 6 5 . 0 7 0 . 0 7 9 . 0 7 9					

*				θ			
L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.098 .086 .079 .057 .046 .034	.088 .074 .064 .054 .038 .030	.091 .082 .074 .058 .047 .034	.097 .084 .077 .061 .043 .032	.099 .088 .078 .061 .045	.111 .099 .089 .071 .051	.115 .100 .093 .076 .060
3370370370370370370370370370370370370370	. 006 - 0003 - 0024 - 0014 - 0030 - 0030 - 0043 - 0044 - 0050 - 0054 - 0054 - 0054 - 0054 - 0054 - 0054	.0034 -0005 -0017 -0244 -0332 -0396 -0498 -0498 -051 -061 -054 -054	.006 .0002 -0014 -0030 -0030 -0030 -0030 -0047 -0047 -0047 -0057 -0057 -0050 -0057	.0001254 -0001244 -0001244 -000131165 -00012567 -0001256	.012 .0003 .0016 .0025 .0034 .0034 .0050 .0050 .0050 .0050 .0050 .0067	021025 021000188 000001881 00001881 00001881 00001881 00000000	.023 .0146 .00189 .00189 .0039 .0039 .0045 .0045 .00516 .0074
933	023	024	040	041 019 005	046 026 012	031 020 013	036 029 025

X		θ										
L	180	165	150	135	120	105	90					
.033 .067 .100 .133 .167 .2033	.090 .083 .075 .058 .047 .035	.098 .090 .080 .067 .053 .042	.087 .082 .071 .055 .042 .033	.0934 .075 .056 .041 .031	.094 .084 .077 .057 .039	.108 .097 .088 .073 .054 .046	.126 .107 .108 .084 .065					
003603703703703703703703703703888	.012 .004 .003 -011 -023 -022 -022 -022 -023 -025 -0332 -0332 -0331	.019 .0016 -0022 -014 -0222 -014 -017 -017 -017 -017 -024 -025 -030 -030 -030	.012 .003 -013 -0229 -0119 -025 -025 -025 -025 -0339 -0340	.009 0026 018 027 027 027 027 027 0324 0324 045 0446	.008 .0017 -0207 -0217 -0019 -0317 -041 -041 -053 -060 -060	.0197 .0004 0111 .0005 0122 0338 0351 0562	0 4 7 3 9 0 0 1 4 4 0 0 0 0 0 1 4 4 0 0 0 0 0 1 4 8 0 0 0 0 0 1 4 8 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1					
.867 .900 .933 .967	043 039 028	036 034 022	042 038 021	053 047 022 009	065 055 020	066 055 009	084 065 019					

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued.

$$M = 1.41$$

		€ =-	3°	$\frac{2\beta y}{L(1-\epsilon\beta)}$	-= .81					€ = -3	3°	<u>2β</u> y	β) = .70		
X	0	15	7.0	θ				X				θ			
		15	30	45	60	75	90	X	0	15	30	45	60	75	9
.033 .067 .100 .133 .167 .200 .233 .267 .303	.157 .1135 .1199 .090 .081	1536 1148 11205 1094 1084 1076	.158 .151 .1310 .094 .097 .082	.1455 .1108 .1085 .0865	139 130 107 097 074 074	.130 .1220 .005 .0058 .051	.125 .117 .098 .078 .062 .054 .047	.033 .060 .133 .160 .233 .267	.158 .1530 .118 .1096 .086	.156 .147 .128 .108 .096 .088 .076	. 155 .146 .131 .107 .094 .085	.148 .140 .122 .106 .086 .081	.141 .134 .1133 .096 .083 .077 .0658	.134 .124 .105 .0845 .067	.1 .1 .0 .0
0370370370370370370370370370370370370370	.051 .0017 .00116 .00140 0059 0046	000001234455229 	0577 0435 00140 -0059389 -005334637 -00577	.045 .0321 .0009 0117 0046 0056 0056 0046	0335 00122 -00134 -001317 -00448 -00683 -00541	. 025 . 00105 - 00066 - 00244 - 00345 - 0049 - 00644 - 00682	02100224002 0000224002 10000224000 1000000000000000000000000000000000	33603 34603 44037 55603 663603 663603 7033	.058 .052 .0317 .0002 0014 0314 0016 0149 0026	.047 .042 .026 .007 0128 041 001 002	.045 .0309 .0005 0018 0331 0404 .0001	.044 .036 .020 .0007 .0016 .00337 .0042 .0007 .0029	0332 018 0004 -0013 -0031 -0041 -0017 -0036	.028 .0022 .0007 0156 0041 0045 0045	0
.833 .867 .900 .933 .967	- 0 4 8 - 0 3 8 - 0 4 4 - 0 5 4 - 0 5 9 - 0 2 5	036 049 062 066	025 035 041 053 054	032 045 045 057 057	043 052 052 062 058	044 051 052 058 053	041 048 046 052 047	.767 .8033 .867 .900 .933 .967	029 043 049 058 071 074	036 047 060 065 081 084	033 043 057 057 071 073	- 0 4 2 - 0 4 8 - 0 5 5 - 0 6 4 - 0 7 6 - 0 7 8	- 0 4 5 - 0 5 2 - 0 5 2 - 0 6 7 - 0 6 7	038 049 056 060 062 068 062	0
X			100	θ											
Ť	180	165	150	135	120	105	90	X	180	105	150	θ			
.037 .0103 .137 .2033 .2360	.093 .083 .076 .054 .042 .031	.087 .072 .067 .057 .029 .021	.094 .086 .076 .060 .049	.097 .083 .076 .060 .042 .031	.101 .090 .079 .063 .049 .033	.109 .098 .088 .069 .051 .040	.122 .108 .098 .0979 .061	.033 .067 .100 .133 .137 .200 .2333	.093 .083 .076 .054 .043 .032	.084 .073 .070 .058 .041 .032	.091 .082 .074 .059 .047 .037	. 095 . 084 . 074 . 058 . 044 . 032 . 026	.103 .093 .082 .066 .054 .038	105 .107 .095 .084 .071 .058 .041 .036	11100000
3370370370370370370370370370370370370370		004 0125 0322 0322 041 045 050 054 054 055 058 058	0159 0109 0108 -00176 -0272 -0272 -0403 -0444 -04559 -04559 -0431	012234 -00034 -00034 -00035 -00034 -0035 -00	.012 .0025 .0024 -0144 -0328 -0333 -0447 -0551 -0551 -0644 -0649 -0438	.019 .007 .006 -010 -020 -034 -034 -0551 -0551 -0653 -0653 -0643 -035	031 019 013 -015 -026 -031 -031 -053 -053 -053 -063 -041	00370370370370370374446037603760376037603760376037603760376037	.008 .0021 .0025 .0325 .0331 .0362 .0482 .0466 .0555 .0444 .0555	.009 .0021 -0012 -0030 -0030 -0030 -0040 -0051 -0053 -0052 -0052 -0032 -0032	.015 .0008 -0008 -0029 -029 -035 -004465 -004465 -00520 -00322 -00322	.013 .001 -001 -024 -032 -038 -046 -051 -051 -054 -034 -0334 -0334	.019 .00106 007 0018 029 029 029 0416 045 045 043 033	.020 .0012 .0026 0077 018 031 041 050 050 050 050 050 050 050 047 044	
.967	.007	008 .007 .063	003 .012 .073	010 .003 .052	024 008 .068	028 014 .068	037 028 .050	.933 .967	016 011 .004	011 011 003	015 010 .003	025 018 003	031 012 003	042 038 014 .056	0

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$\left[M = 1.41\right]$$

 $\epsilon = -3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .39$

м.				θ			
X	0	15	30	45	60	75	90
.033 .067 .100 .133 .167 .203 .2367	.167 .162 .141 .129 .112 .099 .098	.166 .160 .141 .124 .104 .098 .082	.154 .145 .129 .1093 .084 .072	.141 .130 .102 .085 .074 .0659	.142 .128 .109 .092 .075 .065	.132 .120 .103 .085 .070 .060 .051	.121 .112 .093 .079 .000 .056
037037037037037037 4446036036036036036036036036036036036036036	115 108 089 089 059 033 007 -007 -023 -049 -077 -106 -1096 -1096 -1096 -1120 -121	135 1123 1081 1081 1081 1081 1081 1081 1081 108	.077 .110 .087 .067 .047 .030 .009 .015 .009 .010 .027 .049 .061 .089 .109 .109 .1114 .112	.060 .0975 .0527 .0101 .0023 .0237 .0017 .0023 .00375 .0084 .0091 .1102 .1102 .1117	.043 .0867 .041 .020 .0011 .020 .0011 .020 .0015 .0058 .0058 .0087 .0102 .1102 .1102 .1113	0279059059059059059059059059059059059059059	0 1 9 0 42 0 5 3 0 0 8 0 0 0 8 0 0 0 8 0 0 1 9 0 0 0 1 9 0 0 0 1 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

				θ			1 00
Ê	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.097 .088 .079 .059 .047	.097 .086 .082 .066 .054	.092 .083 .072 .0547 .035	.095 .085 .075 .053 .034 .029	.097 .088 .076 .059 .042 .031	.106 .098 .087 .070 .055 .042	.121 .107 .102 .079 .065
7037037037037037037 233344445556667778888999	014 007 003 -006 -009 -002 -014 -014 -026 -038 -039 -039 -049	020 0118 0001 0001 0003 0004 00009 -0014 -016 -027 -037 -037	.012 .0007 .00108 .00105 .00105 .0020 .00213 .00273 .00273 .00448 .00448	.0133 .0000 -0001 -0004 -0001 -0008 -00122 -0028 -0028 -0028 -0046 -00513 -00513	0 8 1 5 5 5 5 9 2 2 2 7 3 8 0 6 7 6 8 9 0 2 9 5 5 9 2 9 5 5 9 9 5 9 5 9 5 9 5 9 5	018901628 0016280010010000000000000000000000000000	0 2 8 0 19 0 37 0 28 0 0 9 9 0 0 5 0 0 5 0 0 5 0 0 5 0 0 6 0 0 7 0 0 6 0 0 7 0 0 0 7 0 0 0 7 0

€=-3°	2By 57
€=-3	$\frac{\angle \beta y}{L(1-\epsilon\beta)} = .57$

		θ									
× L	0	15	30	45	60	75	90				
. 0 3 3 . 0 6 7 . 1 0 0 . 1 3 3 . 1 6 7 . 2 0 0 . 2 3 3 . 2 6 7	. 1532 . 1538 . 1322 . 1034 . 094 . 0878	.164 .155 .140 .124 .108 .0987 .079	.1517 .1430 .108 .096 .085	.140 .138 .118 .099 .086 .071	1326 1112 087 077 0767 059	1326 1114 10878 0068 0054	.116 .111 .101 .075 .066 .051 .044				
30337 3337 440337 4460 3560 66037 7760 80337 80337 80337 80337 80337 80337 80337 80337	.054 .050 .033 .0133 .0033 .0033 .0027 .0024 .0021 .0021 .0036 .0046 .0059 .0075 .0083 .0083 .0093	.058 .049 .032 .0152 .0051 .034 .0163 .0054 .0163 .0054 .0054 .0052 .0054 .0054 .00564 .00564 .00758 .0064	046 0423 0007 00213 00125 00027 00125 00027 00027 00027 00027 00027 00027 00027	.03377 .001037 .001037 .001042 .00042	.0324 .00249 .000111 .00277 .00029 .00185 .00408 .00683 .00825 .0	02944103357410357166822726 	018339 000233028 000233028 001240 001				

				θ			
X L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.089 .080 .071 .054 .040	.095 .085 .079 .067 .051	.089 .080 .073 .057 .044 .035	.0911 .0874 .0759 .042 .037	.096 .082 .081 .062 .044 .034	.111 .099 .074 .057 .046	.118 .102 .105 .080 .062 .049
2233544455556667778888	009 0000 -002 -013 -025 -035 -035 -040 -036 -036 -027 -026 -026	019 011 008 -004 -014 -023 -023 -027 -027 -027 -028 -028 -028 -028 -028 -028 -028 -028	012 0006 0007 -0123 -0301 -035 -035 -035 -035 -035 -038 -038 -038 -038 -038 -038 -038 -038	012 0002 0002 -0017 -024 -0354 -0403 -0344 -0344 -0344 -0344 -0344	.010 .0004 -015 -027 -037 -036 -034 -039 -047 -047 -042 -047	.025 .0118 0066 0189 0311 0322 0125 025 0443 0450 0464	027 0109 -00168 -0288 -0237 -01105 -0236 -0237 -00105 -0055
.900 .933 .967	030 027 008	024 020 004 .036	031 027 007 .035	037 033 005	048 039 .001 .037	051 041 .006	057

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$\left[M = 2.01\right]$$

$$\epsilon = 0^{\circ}$$
 $\frac{2\beta y}{L(1-\epsilon\beta)} = 3.80$

X				Θ			
Ê	0	15	30	45	60	75	90
.033 .067 .100 .133 .167 .200 .233	.117 .110 .095 .084 .0755 .0659	1217 10993 10980 10663 1045	1218 1102 1093 10969 10653	.115 .0997 .0875 .0056 .040	.114 .111 .096 .087 .0761 .054	.117 .098 .098 .0743 .055 .036	.119 .119 .099 .099 .078 .067
037037037037037037 036036036036036036 036036036036036036	.031 .0275 .00037 .00037 -0014 -0024 -0034 -0034 -0054 -0056 -00661 -0067	7 7 0 0 6 4 9 8 29 4 9 7 8 25 5 7 4 8 2 5 5 7 4 8 7 5 6 6 7	033805410048996500000000000000000000000000000000000	03244 002144 0009622522 001225222 00122522 00122522 00122522 00122522 0012252	0 2 9 9 0 0 1 9 9 0 0 0 9 9 0 0 1 4 2 0 0 1 4 2 0 0 2 3 0 0 0 1 4 2 0 0 5 1 3 1 0 0 6 6 3 7 0 0 6 6 6 2 0 0 6 6 6 2 0 0 6 6 0 0 0 6 6 0 0 0 6 6 0 0 0 6 6 0 0 0 6 6 0 0 0 6 6 0 0 0 6 6 0 0 0 0 6 6 0 0 0 6 6 0 0 0 6 6 0 0 0 6 6 0 0 0 0 6 6 0	.0288. .01033. .01033. .0100288. .02344. .02344. .03345. .0662. .06640. .0778.	.00166 .00194 .00103334127 .001333427 .00556666666666666666666666666666666666

X				θ			
Ê	180	165	150	135	120	105	90
36037 1136037 12337 2367	.118 .1102 .097 .087 .072	.117 .110 .105 .096 .083 .066	.121 .116 .108 .100 .086 .070	.116 .111 .103 .093 .082 .064	.114 .107 .100 .091 .081 .062	.114 .107 .101 .092 .079 .063	.117 .111 .101 .094 .067
0036036037037037 037037037037037037 036036036036036036	.042 .030 .026 .007 004 012 031 034 034 052 054 0559	.041 .025 .0132 .007 .007 .007 .0021 .0032 .0034 .0034 .0045 .0045 .0057	.0456 .0331 .0189 0029 0029 00396 00541 00547 00547	.042 .030 .024 .013 .003 008 013 021 032 032 041 043 050 057	.037 .028 .021 .012 .002 -009 -0032 -040 -048 -048 -048 -063 -063	.039 .023 .011 .000 017 024 036 045 045 060 060	.04327 .0166 0044 0117 0241 0314 00527 0057
.900 .933 .967	068 065 067 082	065 064 063 084	061 052 044 038	067 065 066 080	069 061 049 045	066 057 045 040	065 056 048

00	2βy	00	
€ = 0°	L(1-€B) =	.98	

X	θ									
Ē	0	15	30	45	60	75	90			
.0337 .1000 .1337 .1600 .2367 .2003	1115 0982 0052 00536	126 1224 1007 1095 1007 1006 1006 1006 1006 1006 1006 1006	1109 1099 1099 10097 10055 1005 10055 10055 10055 10055 10055 10055 10055 10055 10055 10055 1005	1119982 1000762 1000762 100042	113 112 0984 0075 0081 0051	.116 .115 .097 .087 .074 .0555	.122 .110 .089 .078 .065			
336037037037037037 44465360360337037 666677760360360360360360360360360370370370370370370370370370370370370370	0315 00214 00039 00165 -0027 -0037 -0037 -0044 -0061 -0061 -00624 -0038 -0038	.040 .0237 .0124 -00155 -0019 -0024 -0034 -0034 -0034 -0046 -00514 -00514 -0023	.0281023383300000000000000000000000000000	.0292 .00122121 .00122121 .001221 .001201 .00227 .00337 .00527 .00661 .00662 .00406 .00406	.027 .00063 -00121 -0027 -0031 -0040 -0040 -0061 -00623 -0067	02930122 00122 00122 00077 00178 00333 00345 00345 005569 0056133 00633	000100011000000000000000000000000000000			

X				Θ			
Ê	180	165	150	135	120	105	90
.033 .067 .100 .1337 .1600 .233	.113 .108 .100 .093 .079 .062	.120 .117 .108 .098 .083 .067	.110 .105 .096 .087 .0757	.110 .106 .098 .089 .077 .059	.109 .104 .096 .087 .076 .057	.113 .109 .101 .090 .079 .060	.115 .108 .101 .089 .076 .062
0036037037037 037037037037037 0360360360360360360360360360360360360360	.036 .024 .020 .010 .002 007 021 021 033 037 041 046 056 056	.041 .036 .015 .0006 0010 018 0286 033 035 045 0549	.0226610910961-0012961	.035 .020 .029 001 0127 0267 0344 0345 0452 0588 0588	.034 .020 .009 -0016 -016 -023 -034 -034 -035 -055 -056 -056	.035 .020 .010 .002 013 020 034 034 044 0449 0449 0566 0559	. 0 41 . 0 22 . 0 11 . 0 0 0 62 . 0 11 . 0 0 0 23 . 0 0 12 . 0 0 12 . 0 0 0 32 . 0 0 0 44 . 0 0 55 . 0 0 55 . 0 0 55
.900 .933 .967	065 062 063 071	058 057 053 068	065 059 056	066 063 060 068	064 056 055 058	061 057 048 062	061 045 040 059

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$M = 2.01$$

€ = 0°	2βy	86
E = 0	$\frac{Z\beta y}{L(1-\epsilon\beta)} =$.00

€ = 0°	$\frac{2\beta y}{L(1-\epsilon\beta)} =$	77
e - 0	$\overline{\lfloor (1-\epsilon\beta)}$. 1 3

X				θ			
T	0	15	30	45	60	75	90
.033 .067 .100 .133 .167 .203 .2337	1108 1091 0983 0073 0055	.121 .116 .098 .099 .079 .0761	.114 .108 .090 .082 .071 .069	.119 .1193 .091 .073 .0756	1111 1086 00686 00686	.1177.0994.087.071.0660.036	.119 .113 .097 .087 .063 .063
037703770377037 0336036036036037037 034446036036036037037 03888996	0 32 34 4 0 0 1 1 7 6 9 9 1 0 0 1 1 7 6 9 9 1 0 0 1 1 7 6 9 9 1 0 0 1 1 7 6 9 1 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	9 18 6 7 8 4 4 8 6 7 6 7 1 1 7 8 4 4 7 9 7 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0000011000000494574497744997	7 00 4 4 0 0 0 0 0 3 7 0 0 6 7 3 0 3 7 0 5 1 1 1 6 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	. 0 2 0 8 3 2 0 0 2 2 0 0 2 2 0 0 0 2 2 0 0 0 2 2 0 0 0 2 0	0 & 8 0 0 0 0 1 0 1 2 8 8 0 0 0 0 1 0 1 1 2 8 8 0 0 0 0 1 0 1 1 8 9 0 6 5 7 7 0 0 0 1 0 1 0 1 0	0304 0012 0010 - 0117 - 0129 - 0329 - 0334 - 0558 - 05538 - 05538 - 0549 - 0442
.967	089	080	074	086	078	082	077

033	X				θ			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	<u>X</u>	0	15	30	45	60	75	90
$\begin{array}{cccccccccccccccccccccccccccccccccccc$.067 .100 .133 .167 .200 .233	.103 .093 .087 .072 .062	.112 .101 .093 .082 .069	.108 .098 .092 .078 .065	.107 .096 .089 .076 .061	.110 .096 .091 .081 .062	.110 .099 .090 .082 .062	.11199 .097658 .0540
.967 .00010009309909909009108	337033703370337033703370337033703370337	0210178900103252765656565656566666666666666666666666	00000111100000100000000000000000000000	.023 002 002 002 024 027 027 023 022 022 022 024 024 024	. 0 2 2 . 0 13 . 0 0 2 2 . 0 14 . 0 2 0 . 0 19 . 0 2 7 . 0 3 6 . 0 18 . 0 0 9 . 0 2 3 . 0 2 9 . 0 2 3 . 0 2 9 . 0 2 9	. 0 2 2 . 0 1 2 . 0 0 1 2 . 0 0 1 1 . 0 0 1 9 . 0 0 2 6 . 0 0 2 8 . 0 0 2 6 . 0 0 2 6 . 0 0 3 1 . 0 0 3 5 . 0 0 3 5 . 0 0 4 4 . 0 0 5 9 . 0 0 0 5 9 . 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.19 -0.012 -0.012 -0.016 -0.030 -0.035 -0.035 -0.032 -0.032 -0.032 -0.030 -0.0	0 2 2 4 4 4 1 1 1 2 6 6 7 7 7 2 2 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1

<u>x</u>		θ								
<u>X</u>	180	165	150	135	120	105	90			
.033 .067 .100 .133 .167 .200	.111 .103 .099 .080 .061	.118 .113 .105 .084 .065	.110 .105 .098 .086 .074 .057	. 110 . 106 . 098 . 037 . 035 . 059	.109 .105 .093 .085 .071 .056	.111 .105 .095 .087 .074 .059	.114 .106 .098 .088 .075 .061			
3003370337044033704460337066033776603377688367	.036 .025 .009 .009 .001 -009 -017 -028 -034 -034 -034 -042 -042 -060 -060	043 0225 00157 00107 00120 001	034 0237 00071 00016 -00259 -00356 -004417 -00586 -0059	035 0248 0099 0001 - 0084 - 0217 - 0344 - 0334 - 0334 - 0556 - 059	.033 .021 .018 .007 -0023 -012 -024 -0324 -034 -040 -041 -055 -052	.035 .024 .018 .007 -0011 -016 -023 -028 -034 -034 -044 -0444 -055 -056	. 0 38 . 0 27 . 0 2 2 . 0 1 2 . 0 0 2 6 . 0 0 1 3 . 0 1 3 . 0 1 3 . 0 3 3 8 . 0 3 4 . 0 4 8 . 0 5 2 . 0 3 8			
.900 .933 .967	069 060 053 067	050 047 045 070	056 051 052 060	052 045 044 060	052 051 055 065	044 043 044 064	042 042 044 063			

<u>x</u>	θ								
È	180	165	150	135	120	105	90		
.033 .067 .100 .133 .167 .200	.111 .100 .095 .088 .080 .059	.1113 .105 .094 .083 .067	1115 .096 .087 .076 .060	.1114 .095 .095 .074 .060	.1103 .096 .088 .072 .060	.110 .106 .096 .086 .076 .059	.112 .104 .097 .086 .080		
267 33337 3337 3337 4337 44337 66337 6637 7767 8337 880337 9337	.036 .024 .019 .009 .000 -014 -026 -034 -038 -039 -047 -053 -057 -058 -059	.043 .0347 .0155 .0055 -0049 -0022 -0330 -0330 -0345 -048 -048 -048	.036 .021 .009 .009 .009 .009 .009 .0025 .025 .0334 .0334 .0343 .047 .047	.035 .026 .019 .009 .009 .015 .027 .034 .039 .042 .050 .050 .050 .045	.035 .025 .019 .009 .000 -0014 -021 -0227 -0325 -035 -040 -041 -045 -045 -045 -046 -046	.034 .018 .007 .007 .0016 .0027 .0027 .0035 .0041 .0040 .0035 .0040 .0035 .0037 .0040	0 3 2 8 1 0 1 0 1 9 1 5 2 3 1 0 0 2 1 0 1 0 1 9 1 5 2 3 1 0 0 6 7 2 2 2 3 5 6 8 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1		

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$\left[M = 2.01\right]$$

 $\epsilon = 0^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .60$

-0	2βy
€ = 0°	$\frac{2\beta y}{L(1-\epsilon\beta)} = .48$

	θ									
T	0	15	30	45	60	75	90			
033 067 100 133 167 200 233 267	.110 .1035 .0866 .0772 .0653	120 1115 1099 086 074	.1106 .1002 .087 .075 .064 .057	.1136 .1005 .0056 .0752 .0656 .039	112 108 104 088 074 061	1114 11135 00867 00662 0043	.115 .111 .104 .091 .077 .062 .057			
3336037037033703370337033703370337	023 024 011 0004 007 026 037 0009 0001 -011 -035 -056 060 -060	04060	0 2 2 3 3 1 1 4 0 1 3 3 5 4 0 1 1 3 4 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 2 8 0 2 10 1 0 1 1 2 3 0 0 1 2 2 0 0 1 2 3 0 0 0 0 1 2 3 0 0 0 0 1 2 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	.027 .021 .009 -003 -014 -007 -007 -000 -014 -029 -046 -0551 -059 -062 -078 -081	.032 .027 .014 .0027 -0148 -008 -010 -008 -010 -029 -029 -034 -049 -049 -0669	0 3 2 4 4 0 0 0 1 1 8 8 0 0 0 1 4 1 0 0 1 1 8 1 0 0 1 1 8 1 0 0 1 1 1 1 0 1 1 1 1			

X				θ			
L	0	15	30	45	60	75	90
.033 .067 .1003 .167 .200	113 1000 0091 0084 0071 0059	118 1111 102 094 082 065 065	.113 .110 .101 .087 .077 .065 .058	.115 .196 .089 .076 .065 .065 .038	.111 .197 .088 .074 .062	.118 .114 .102 .090 .079 .069 .058	.116 .116 .107 .088 .078
.303703370337033703370337033703370337033	0220 0220 00643 0083 00010 00121 00373 00645 00805 00905 00905	.041 .034 .094 .0738 .058 .045 .017 .017 .019 .019 .019 .045 .045 .045 .045 .045 .045 .045 .045	.0293.0445.0647.0339.0109.0015.0132.0109.0577.00863.0109.00677.00863.0118	.030 .027 .048 .048 .016 .010 .016 .010 .0128 .028 .044 .057 .057 .075 .075 .075	.025 .020 .020 .022 .026 .002 .002 .002 .002	.033 .027 .016 .017 .017 .024 .008 .001 029 031 049 056 056 073 079	0314

x				θ			
Ê	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	1123 1097 0982 0664	.121 .116 .108 .098 .088 .072	.107 .101 .094 .086 .075 .059	.109 .102 .096 .096 .076 .060	.106 .101 .094 .089 .073 .057	.111 .105 .1094 .082 .062	.109 .109 .099 .088 .076
26703703370337033703370337033703370337033	039 028 021 011 001 -008 -015 -025 -035 -035 -036 -046 -046 -042	.048 .0360 .0190 .0110 .0015 .0020 .0200 .0336 .0336 .0336 .0336	.0333 .0177 .0073 .0177 .0073 .0128 .0288 .03379 .03379 .0434 .0447	0 3 5 5 0 2 2 5 1 0 2 2 5 1 0 2 2 5 1 0 2 2 5 1 0 0 1 1 7 1 0 0 2 3 2 3 3 3 6 6 1 0 0 3 3 6 6 1 0 0 3 3 6 6 1 0 0 3 3 6 6 1 0 0 3 3 6 6 1 0 0 3 3 6 6 1 0 0 3 4 0 1 0 0 4 8 1 0 0 0 4 8 1 0 0 0 4 8 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	. 0 3 3 3 . 0 1 3 8 . 0 1 3 8 . 0 1 3 9 . 0 1	.039 .0222 .0123 .0123 .0123 .0123 .0124 .0124 .0124 .0224 .0224 .03318	038
.933 .967	038 040 064	031 031 054	047 046 064	048 050 069	053 056 073	049 051 067	059 059

X				θ			
X L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.106 .100 .099 .089 .080	.114 .107 .101 .093 .082 .064	108 102 097 087 077 060	.108 .108 .099 .089 .078 .060	.106 .103 .094 .086 .071 .056	.112 .107 .099 .091 .081 .062	.111 .106 .100 .089 .077 .062
2036037037 233360337037 4450360357 6660367 776037	.036 .027 .020 .009 .009 .0017 .0217 .0312 .0310 .0310 .0310 .0310 .0310 .0310 .0310 .0310 .0310 .0310	.041 .031 .024 .013 .0004 016 019 029 023 022 027 027	.034 .019 .008 .000 010 021 021 021 022 032 033 034 034	.036 .025 .020 .009 .009 .009 .014 .016 .023 .023 .035 .035 .0341	.032 .019 .016 .004 012 013 013 018 018 021 033 037 043	.040 .027 .023 .011 .003 .000 .000 .000 .000 .000 .00	.037 .027 .021 .0012 .006 .007 .007 .0014 .0043 .0011 .0334 .0334 .0349
.900 .933 .967	047 047 052 076	037 040 042 066	041 044 047 068	053 055 059 080	058 061 064 084	057 058 062 081	062 064 067

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$\left[M = 2.01\right]$$

$$\epsilon = 0^{\circ}$$
 $\frac{2\beta y}{L(1-\epsilon\beta)} = .35$

X		θ										
	0	15	30-	45	60	75	90					
.033 .067 .100 .1367 .200 .233	112 110 096 086 074 064 054	1116 1104 097 081 063	.116 .110 .101 .091 .078 .065 .056	.116 .112 .101 .091 .075 .054 .058	.116 .114 .100 .091 .078 .064	.117 .116 .100 .093 .079 .064 .057	1113 099 088 073 064					
3357033703370337033703370337033703370337	115 104 062 036 038 038 039 005 -0034 -0047 -0081 -0091 -0091 -0091 -1095 -1102 -1106	1108 108666826683168 007528683168 000000000000000000000000000000000000	. 108 .09744 .055484 .005484 .001664 -00244 -00777 -00982 -00961 -1110	. 0 9 7 9 8 9 9 7 9 8 9 8 9 7 9 8 9 9 8 9 9 7 9 8 9 9 7 9 8 9 9 7 9 8 9 9 7 9 8 9 9 7 9 9 9 9	0 6 9 4 4 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	0566 05944 0257 02257 02257 00235 00200 003356 00566 00566 00761 00761 0095	0 41 0 41 0 41 0 12 0 12 0 12 0 12 0 12 0 13 0 14 0 14 0 15 0 17 0 17 0 17 0 17 0 17 0 17 0 17 0 17					

v				θ			
Ť.	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.111 .102 .096 .088 .079 .063	.116 .110 .106 .096 .085 .066	.111 .105 .099 .099 .078 .060	.109 .103 .096 .037 .076 .061	.107 .103 .095 .087 .073	.110 .105 .100 .090 .079 .062	.110 .104 .098 .089 .075
230337033703370337033703370337	.038 .027 .020 .012 .004 014 013 017 016 019 023 022 028 028	.041 .032 .026 .015 .007 .001 004 012 014 021 021 021	.035 .023 .022 .010 .006 .001 004 014 014 024 024 023 035	.034 .0220 .0230 .0131 .0055 .0000 0012 0012 0012 0012	.034 .022 .022 .014 .005 .012 .004 .006 .0015 .015 .020 .030 .030 .030 .030 .030 .030 .030	.037 .029 .036 .025 .025 .027 .007 .007 .008 018 027 035 045 045	.035 .040 .042 .035 .015 .015 .016 .016 .036 .036 .036 .036 .036 .036 .036 .03
.900 .933 .967	052 057 061 088	049 054 061 085	055 059 066 087	063 067 073 095	073 079 100	072 076 097	08

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$\left[M = 2.01\right]$$

		€=3	3°		$\frac{2\beta y}{1-\epsilon\beta} = 4.1$	0					€ = 3	,	2βy L(1-εβ	3) = .94		
Y				θ									0			
X L	0	15	30	45	60	75	90		- X	0	15	30	θ 45	60	75	90
.033 .067 .100 .133 .167 .200 .2337	.089 .085 .071 .075 .054 .042 .035	.082 .080 .068 .055 .047 .035	.0939 .0077 .0057 .0047 .00425	.0995 .0975 .0771 .0040 .0040	.099 .095 .082 .073 .060 .049	.108 .1090 .082 .068 .050	. 102 .098 .084 .070 .060 .060 .046 .037		.033 .060 .133 .167 .2033 .267	.088 .080 .0660 .049 .041 .033	.086 .077 .067 .054 .041 .040	.093 .082 .068 .061 .047 .037	. 0 9 7 . 0 9 0 . 0 7 3 . 0 6 9 . 0 5 4 . 0 4 7 . 0 4 0	.101 .094 .079 .079 .054 .048	.106 .095 .083 .0759 .050	.117 .110 .090 .084 .071 .058 .036
3333 3333 3367 4400 437 5533 567 5600 633 6667 7700 7737 787 8003 900 9933 9933	0213 00078 -0137 -0146 -0322 -0340 -047 -047 -0532 -0549 -05549 -05549 -05549	.0128 0028 00133 0129 0336 0336 0345 0352 0552 0553 0551 0617	.02050 .001556 .00137 .00173 .00173 .00253 .00331 .00350 .0050 .0050 .0050 .0050 .0050	.011229 -00117229 -00117229 -0033583 -004505576 -0055733 -00661	01348 -00188 -00216 -002308 -002308 -00407 -00579 -00579 -00649 -00641	. 02189 - 00189 - 00165 - 001253 - 001253 - 00253 - 00599 - 00699 - 00	0 1 3 0 0 0 9 0 0 1 1 0 0 1 5 0 2 4 0 2 2 9 0 2 2 9 0 2 4 3 0 0 4 3 0 0 6 7 0 0 6 7 0 0 7 6 0 0 8 1 0 0 8 5		300 3333 400 4337 500 5333 5600 6337 700 7333 767 8337 900 933	.014 .0012 .0001 .0016 .024 .031 .031 .041 .049 .053 .049 .053 .033 .033 .033 .033 .033 .033 .033	.010 .006 .005 .0016 .024 .030 .037 .0416 .051 .051 .055 .039 .039	.013 .00103 .00103 .00109 .00129 .00324 .00347 .00347 .00471 .00500 .00500 .00500	.015 .00102 .00102 .00102 .00123 .00145 .00358 .004483 .005577 .00468 .00403 .004493 .004403	.015 .01012 .0012 .0027 .0035 .0044 .00517 .005912 .005912 .00622 .0039	.017 .0018 .0019 .0019 .022 .0234 .0344 .0349 .0497 .0592 .0635 .0635 .0635 .0635	.025 .019 .008 003 013 021 034 044 045 055 065 065 066
								_			.012	.073	077	081	082	-,085
X				θ	J. FAIL]	X	1/4/4			θ		Lynn III	
L	180	165	150	135	120	105	90		X L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200 .233	.159 .152 .144 .134 .122 .099 .095	.149 .145 .138 .127 .113 .094 .089	.147 .142 .135 .125 .115 .095	.134 .137 .124 .116 .104 .084	.127 .128 .117 .109 .099 .079	.118 .119 .107 .100 .091 .071	.098 .093 .088 .074 .065 .046		.033 .067 .100 .133 .167 .200 .233	.154 .149 .139 .127 .114 .096	.144 .141 .131 .120 .109 .088	.141 .140 .132 .1105 .087	.133 .134 .125 .111 .001	.122 .123 .112 .100 .089 .073	.113 .114 .103 .091 .084 .064	.101 .101 .093 .082 .070 .055
3333 3367 44603 44360 55600 55600 56663 7767 6663 7767 88337	072 057 053 041 029 016 001	.0653 .047 .0322 .0113 -0084 -0024 -0024 -0036 -0050 -0060 -066	0663 0505 0324 01034 01034 -0123 -0023 -0023 -0033 -0033 -0035 -00	05550033000035000035000035000035000035000035000035000000	.052 .038 .035 .022 .011 .000 -007 -015 -026 -034 -045 -045 -065 -065	.045 .027 .0156 0012 0182 0239 0338 0368 0576 05563	0 2 3 0 0 9 9 0 0 1 5 0 0 1 5 0 0 1 5 0 0 2 9 0 0 3 9 0 0 4 8 0 0 5 7 0 0 6 2 0 7 6 0 7 6 0 7 6 0 7 6 0 7 8 1		0036037037037 0376036036037037 0446036036037 0376037	065 052 048 034 027 0136 - 004 - 019 - 029 - 038 - 038 - 053 - 059	057 0429 027 017 0057 -0014 -014 -026 -0304 -0450 -057 -066	05429 043287 00071 000112 00112 00112 00112 00113 0011	053 0445 0245 0224 0014 00129 0028 0028 00129 0028 0028 0028 0028 0028 0028 0028 00	.046 .034 .028 .017 .008 .0025 .0125 .036 .043 .0443 .057 .065 .065	.040 .024 .021 .010 .001 008 016 023 027 034 034 047 057 061	0 2 9 0 117 0 0 15 0 0 30 0 0 45 0 0 64 0 0 66 0 0 66 0 0 66 0 0 0 0 66 0 0 0 0 66 0 0 0 0 66 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
.900 .933 .967 1.000	072 075 075 097	080 080 085 106	073 074 077 093	076 075 078 094	079 078 080 096	069 067 067 081	085 085 085 100		.900 .933 .967 1.000	074 075 081 093	079 081 084 098	071 072 074 085	075 074 073 082	077 074 068 078	070 059 052	061 051 047 069

NACA RM L54J29

$$\left[M = 2.01\right]$$

 $\frac{2\beta y}{L(1-\epsilon\beta)} = .80$ € = 3°

€=3°	2βy	6
€=3	$\frac{\angle \beta y}{ (1-\epsilon \beta) } =$.0

x				θ			
Ê	0	15	30	45	60	75	90
.033 .067 .100 .133 .167 .200	.085 .079 .069 .060 .048 .040	0 8 1 0 7 3 0 6 3 0 5 6 0 4 4 0 3 4 0 3 0	0877 00776 00623 0053 00336	.092 .082 .074 .066 .056 .042	104 095 085 076 069 0546	.107 .098 .088 .081 .070 .052	.115 .1090 .090 .086 .070 .058 .052
337037037037037037037037037	015 013 002 -0016 -024 -0328 -0338 -0359 -	00045 -0017834 -00178334 -00334 -00336 -00336 -00336 -00336 -00336 -00336 -00336 -00346 -00336 -0034	.015 .0011 .002 -0111 -026 -0332 -0332 -0046 -0231 -0046 -0347 -0347 -0347 -0346	01101986553899332663326633260332603260	0215544250000000000000000000000000000000	018438421 -00123421 -00123421 -00123421 -00123421 -00123421 -001234 -0	. 0 2 15 6 7 7 6 6 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8
.000	079	083	081	080	079	085	088

X	θ									
Т	0	15	_ 30	45	60	75	90			
.033 .067 .100 .133 .167 .200	086 079 070 060 051 043	.073 .075 .0654 .043 .031	.083 .078 .074 .062 .050	087 0884 0882 068 054 044 0440	097 0993 0976 0076 0062 0044 0027	.0995 .0995 .0977 .0650 .048	.109 .1037 .087 .087 .056			
.3360337033703370337033703370337033703370	018 0165 00205 00215 002	.008 -0058 -007 -027 -0312 -008 -007 -0124 -008 -0033 -0338 -045 -046 -050 -048 -062	0149 0000119 00119 001221 0000221 0000221 0000221 000222 000232 00023 00023 00020	.0161 .00131 .00131 .00205 .00205 .0028 .0028 .00303 .0016 .0027 .00304 .00304 .0047 .0047 .0047 .0055	.020 .014 -008 -019 -030 -030 -026 -0013 -026 -035 -035 -035 -036 -040 -040 -052	.019 .00133 -0019 -0024 -0024 -0024 -0028 -0037 -0044 -0044 -0047 -0047 -0049	. 023 . 0114 - 0016 - 0167 - 02348 - 00344 - 0039 - 00449 - 00499 - 00633			

X				θ			
T	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.152 .146 .137 .126 .115 .094	.141 .139 .131 .118 .108 .086	.137 .134 .127 .114 .103 .086	.131 .131 .123 .109 .099 .083	.125 .127 .117 .105 .093 .079	.113 .110 .104 .092 .082 .067	.101 .098 .099 .079
23370337033703370337037703770377037703703	.064 .053 .045 .034 .025 .014 .005 .005 .0011 .0026 .032 .040 .040 .040 .055 .057	057 0044 0026 0016 0004 0002 0002 0002 0003 0003 0003 0003	0563 0449 0227 00052 00113 00225 00113 00225 00157 00557 0069	0529553 003553 0022 00024 00024 00028 0002	.050 .040 .035 .023 .013 .003 .003 .002 .003 .002 .003 .003 .00	0415 0027 00134 000528 0001287 0001287 000406 000528 00052	0 2 9 1 3 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
.933	072 072 072	082 079 077 097	067 064 076	063 062 075	052 053 068	049 049 068	048 048 070

<u>x</u>				θ			
Ī	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.153 .147 .141 .128 .119 .099	.135 .132 .127 .1105 .087	.138 .138 .129 .1108 .091	.126 .123 .118 .110 .101 .080	.123 .123 .114 .109 .095 .078	.109 .109 .1097 .080 .062	.097 .094 .092 .085 .071 .056
23336037037037037 446036036036036036036036036036036036036036	.070 .055 .0550 .0364 .015 .0070 -019 -023 -031 -037 -044 -052	.054 .042 .037 .023 .012 .0028 016 028 0339 044 065	.061 .050 .041 .030 .0020 .009 .0006 0143 027 032 039 055 0556	.052 .038 .039 .019 .011 .000 007 014 024 027 033 039 049	.049 .040 .033 .020 .011 .002 004 029 037 045 045 045	,038 .026 .019 .009 .009 009 023 023 035 035 035 039 041 038	.031 .0205 .0005 -0003 -0014 -0216 -03305 -03305 -03305 -03305 -03305 -03403
.900 .933 .967	063 062 065 091	070 067 067	060 059 060 075	057 056 058 073	055 053 056 071	053 055 057 072	054 054 058 076

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$\left[M = 2.01\right]$$

 $\epsilon = 3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .52$

- 70	2 <i>β</i> y	70
€=3°	$\frac{2\beta y}{L(1-\epsilon\beta)}$ =	.59

L O .0337 .079 .0679 .0688 .11039 .0688 .11039 .0488 .2030 .0330 .2367 .0088 .2333 .0330 .2367 .0088 .2333 .013 .3367 .0088 .2467 .0088 .2567 .0088 .267 .0088 .267 .0088 .267 .0088 .267 .0088 .267 .0088 .267 .0088 .267 .0088 .267 .0088 .267 .0088 .267 .0088 .267 .0088 .267 .0088 .268 .0088			θ			
067 078 1000 068 1133 058 1133 058 1233 0380 1333 0380 13337 0380 13337 008 1400 0010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1433 023 1400 010 1400 010 1400 010 1400 010 1400 010 1500 01	15	30	45	60	75	90
.333 .013 .367 .008 .400 .0023 .500 .0010 .533 .010 .567 .004 .600 .016 .633 .016 .667 .004 .633 .016 .7033 .016 .7033 .005 .800 .005 .800 .005 .800 .005	.078 .076 .064 .056 .045 .035 .029	.0984 .007564 .006544 .00331	.094 .089 .073 .065 .055 .045	.102 .098 .083 .073 .0651 .044	.104 .100 .088 .076 .0655 .046	.111 .110 .092 .085 .074
.900060 .933058 .967	72519011783218527469	0174 001336 00281 00274 00074 -00184	0136 000133 001338 0010538 0010538 001056 001056 001056 001056 00564	. 0 2 0 4 0 0 2 0 1 4 8 0 0 0 4 4 7 0 0 0 1 4 9 5 0 0 0 4 7 0 0 0 4 9 5 0 0 0 6 4 9 0 0 6 6 4	.016 .0014 .0013 .0013 .0013 .00111 .00114 .001263 .00405 .00405 .00405 .00405 .00405 .00513	.024 .0155 .00167 .00175 .00140 .00140 .00187 .00187 .004569 .00569

.033 .060 .133 .167 .200	0 .083 .079 .068 .060 .048 .035 .030	.078 .078 .065 .057 .045	.086 .085 .076 .066	.094 .090 .077	.099 .097 .081	75 • 100 • 099 • 084	90
.067 .100 .133 .167 .200	.079 .068 .060 .048 .035	.078 .065 .057	.085 .076 .066	.090	.097	.099	.10
.267	.026	.033	.044 .038 .020	.058 .046 .039	.074 .060 .050 .041	.084 .076 .062 .052 .043	.09 .08 .07 .06
337033703370337033703370337033703370337	. 0 65 0 9 9 0 21 4 1 0 0 0 0 5 0 1 0 0 0 5 0 1 0 0 0 5 0 1 0 0 0 5 0 1 0 0 0 5 0 1 0 0 0 0	00000000000000000000000000000000000000	076666 046464 03149 00082 00011225 -0003476 -006647 -006659	04649178888836361786655	.021 .050 .0448 .0339 .0083 .0003 .00041 .00413 .00616 .00616 .00616 .00616 .0079	019 018 034 029 0066 -0097 -018 -0048 -0064 -0068 -0068 -0068	021

X				θ			
L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .2033	.142 .134 .125 .195	.137 .134 .129 .118 .105 .089	.140 .141 .132 .120 .111 .092	.127 .129 .122 .110 .099 .081	.120 .123 .113 .102 .091 .074	.111 .114 .106 .095 .086 .067	.096 .099 .089 .082 .070
0370370370370370370370370370370370370370	07547 07547	.05537 .03437 .00243 .00156 .00166 .00360 .00360 .00467 .00497 .00497	.064 .052 .046 .0332 .0125 .0105 .0125 .0105 .0124 .0124 .0336 .03	.050 .0425 .0211 .0011 .0016 .0027 .0026 .0027 .0027 .0027 .0028 .0037 .0037 .0044 .0050	.046 .035 .030 .018 .008 .009 .017 .021 .022 .022 .022 .035 .041 .045	.041 .029 .026 .014 .005 .012 .018 .011 .015 .019 .033 .033 .037 .044 .055	0 27 0 27 0 0 20 0 0 19 0 0 19 0 0 19 0
.933 .967	059 063 097	063 066 091	058 061 076	062	061 063 081	061 063 082	062 064 084

X				θ			
X	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.148 .139 .136 .126 .113 .095	.138 .129 .119 .107 .088	.137 .139 .129 .118 .106 .089	.130 .128 .121 .109 .101	.120 .120 .114 .102 .092 .076	.107 .108 .101 .091 .080 .063	.099 .096 .089 .084 .070
2036037037037037 446036036036036036036036036036036036036036	. 0 6 2 . 0 5 4 . 0 4 5 . 0 3 3 . 0 1 0 . 0 0 0 2 . 0 0 1 8 . 0 1 2 . 0 2 7 . 0 3 9 . 0 4 2 . 0 4 2 . 0 4 5	.057 .043 .0441 .025 .014 .003 024 028 037 046 046	. 0 5 7 . 0 4 8 . 0 4 1 . 0 2 9 . 0 1 8 . 0 0 7 . 0 0 1 4 . 0 0 1 8 . 0 0 7 . 0 0 1 4 . 0 0 1 8 . 0 0 1 7 . 0 0 1 8 . 0 0 0 0 0 1 8 . 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	. 0 5 2 . 0 4 1 5 . 0 2 2 2 . 0 10 3 3 . 0 0 0 2 2 . 0 10 4 4 . 0 0 3 3 9 . 0 0 4 3 4 . 0 0 5 0	.045 .035 .028 .018 .007 .008 .007 .008 004 029 021 025 042 042	.039 .024 .010 .011 .011 .003 005 015 031 032 034 044 047	.028 .018 .010 .023 .023 .0214 .0017 .0017 .0025 .025 .031 .031 .030 .050
.900 .933 .967	060 063 071 101	066 071 076 100	059 063 069 089	067 070 075	065 070 074 094	069 072 077 093	076 081 081 101

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$\begin{bmatrix} M = 2.01 \end{bmatrix}$$

 $\epsilon = -3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = 3.57$

X	θ										
T	0	15	30	45	60	75	90				
.033 .067 .100 .133 .167 .200 .233 .267	.157 .152 .134 .117 .108 .097 .084	156 1146 1133 1119 11095 0084	. 153 . 148 . 133 . 121 . 109 . 096 . 084	.141 .137 .1110 .0984 .075	.141 .138 .120 .111 .0986 .072	.127 .125 .109 .0984 .072 .061	.119 .1199 .099 .093 .063 .056				
.3370377037 .4460376037 .556037	.058 .0529 .022 .012 .0018 0010 020	.0043116 .0000116 .000016 .000016	.05497 .0322 .0015322 .00011232	.041 .040 .029 .014 .0015 028 028 030	.044 .039 .0013 .0005 0019 0025 0037	.032 .027 .0104 006 014 023 033 034	.026 .023 .013 0110 0110 0129 0336 0348				

-.098

-.100

<u>x</u>				θ			
T	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.091 .084 .080 .070 .063 .047	.089 .081 .072 .066 .056	. 0 9 4 . 0 8 5 . 0 8 2 . 0 7 3 . 0 6 2 . 0 4 6 . 0 3 9	.095 .083 .078 .070 .058	.107 .095 .091 .084 .069	.111 .100 .095 .087 .073 .057	.116 .106 .097 .092 .076
23336037037037037037 445036036036036037 	.024 .015 .013 .004 016 020 031 031 034 037 044 052	.021 .010 .006 005 012 018 028 035 036 040 044 055 055	.023 .014 .013 .001 -0007 -015 -016 -032 -033 -0337 -0337 -038 -046 -044	022 013 0007 -002 -010 -012 -032 -0337 -0337 -044 -047 -055 -055	.032 .022 .014 .004 0037 037 030 034 037 044 056 056	.034 .024 .018 .006 003 011 023 027 035 037 044 042 053 059 059	.034 .026 .0109 016 016 027 037 037 044 055
.900 .933 .967	052 045 043 068	057 052 050 074	051 048 048 070	060 056 056	062 057 057 079	065 061 064 080	069 067 067

-.116

-.105

-.110

-.104

 $\epsilon = -3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = 1.10$

X				θ			
L	0	15	30	45	60	75	90
.0337 .1000 .1337 .2003 .2337 .2300	156 156 135 121 1091 084	1551 1152 11118 1088 089	1554 11326 11995 11995 10985	11558 111089 11089 10085	11456 11098 00870 0050	135 1097 00760 0040	.11297 .097 .0955 .0055
.3367037703370337033703370337033703370337	.058 .049 .0375 .0154 -0055 -0023 -0023 -00343 -0056 -0056 -0056 -0069 -0069 -0074 -0079	05133604138 00104138 00104138 00104138 00104138 0010407 00108 0010	.0588 .0386 .02144 .00124 .001	0 5 6 3 4 4 0 0 0 0 8 2 0 0 0 0 2 4 8 0 0 0 0 2 3 8 7 0 0 0 5 1 7 0 0 0 6 5 1 7 0 0 6 6 5 1 0 0 8 1 0 0 0 8 1 0 0 0 6 5 1 0 0 0 8 1 0 0 0 6 5 1 0 0 8 1 0 0 0 6 5 1 0 0 8 1 0 0 0 6 5 1 0 0 8 1 0 0 0 6 5 1 0 0 8 1 0 0 0 6 5 1 0 0 8 1 0 0 0 6 5 1 0 0 8 1 0 0 0 6 5 1 0 0 8 1 0 0 0 6 5 1 0 0 8 1 0 0 0 6 5 1 0 0 8 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 4 3 9 5 3 1 1 7 9 9 9 8 2 9 9 5 3 4 7 8 9 5 5 3 4 7 0 0 0 5 5 5 7 4 0	03316277358376510326 00000000000000000000000000000000000	.024 .021 .001 .001 .001 .001 .001 .001 .001

X				θ			
Ť	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .200	.087 .082 .077 .068 .059	.082 .077 .077 .062 .049	. 0 9 3 . 0 8 4 . 0 7 9 . 0 7 2 . 0 6 0 . 0 4 4 . 0 3 9	.094 .083 .079 .071 .054	.103 .092 .088 .081 .065	.110 .095 .092 .084 .068 .053	.110 .098 .091 .087 .069
2037037037037037 4460360360367037 666667778037	.022 .013 .006 004 017 018 024 037 037 045 045 045 050	.012 .003 -0011 -0116 -021 -029 -039 -039 -044 -046 -050 -055	024 015 012 0017 -0013 -0121 -0221 -0330 -0338 -044 -049 -049	019 0106 - 0029 - 0028 - 0028 - 00304 - 00304 - 00304 - 0050 - 0050 - 0050	.027 .016 .013 .004 004 015 022 037 036 040 049 052 053	029 0198 00072 00072 001052 003344 100473 00598 1005981	.022 .0144 .0123 -0033 -0117 -0232 -0329 -049 -0665 -0667
.900 .933 .967	057 049 047 073	054 051 052 072	050 047 046 067	057 052 052	059 053 052 071	064 062 060 074	075 071 072 080

TABLE 2.- PRESSURE-COEFFICIENT DATA FOR THE BODY - Continued

$$\left[M = 2.01\right]$$

		€=-3°		$\frac{2\beta y}{L(1-\epsilon\beta)}$	= .99						€=-3°		$\frac{2\beta y}{L(1-\epsilon\beta)}$	-= .87		
X	0	15	7.0	θ					×				θ			
	,	15	30	45	60	75	90	-		0	15	30	45	60	75	90
0357 01037 116037 2267 2333	.1536 .1140 .1198 .0990 .086	.1447 .11215 .00880 .0086	.152 .1430 .1117 .101 .0980 .061	.1550 .11538 .11155 .0982 .0068	967222980 11111097665	.128 .126 .1194 .094 .071 .060	11129 0098 00777 005529		.0337 .1003 .1167 .2033 .267	992 11532485586 11109866	1147 11109 11098 10085	289975155 544210986 1111110986 000	59817319 11120996 000	.14367 .1107 .00981 .00752	122285 110986 00661	.114 .112 .095 .084 .072 .0551
100560370370370370370370370370370370370370370	0043438 000036 000036 000036 000038 0000038 000038 000038 000038 000038 000038 000038 000038 000038 0000038 0000038 0000038 0000038 0000038 0000038 0000038 0000038 00000038 00000038 00000000	.0544 .0324 .0014 .0014 .0004 .0016 .0028 .0016 .0028 .0016 .0028 .0058 .0071 .00336 .005336	.05499 .00144 .00191 -0014425317 -003444 -005643 -005643 -005444 -005643	0548 0384 010284 010285	.0413311 -002301 -00200 -003000 -003000 -00486 -00668577 -00668577	.0338 .00184 .001044 .001144 .003322 .004508 .00664 .00508 .00664 .00743	0 2 4 0 0 2 0 0 0 9 9 0 0 1 2 0 0 2 0 0 0 2 0 0 0 2 0 0 0 2 0 0 0 3 4 0 0 4 5 0 0 5 1 0 0 6 1 0 0 7 0 0 0 6 9		3337 4003 4403 4500 5337 5600 7703 6667 7703 767 8003 8667 900 933 967	061100311223043000000000000000000000000000	0546275368759973426001122399511233466	.05464 .00197 .00112 .00112 .00225 .00122 .00222 .00222 .00223 .00222 .0022 .00222 .00	3688016804818856865 5458100188744818865 00008100188744514845	0 4 2 4 4 2 4 4 0 0 3 2 4 4 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	.033 .027 .016 .0047 017 018 029 047 052 065 065 0665 0644 0665	.026 .021 .010 -001 -0014 -022 -023 -044 -052 -064 -071 -071 -071 -074 -064 -052 -064 -071 -074 -064 -064 -064 -064 -064 -064
						002	084	١	1.000	099	108	102	098	097	094	091
X				θ				7	v				θ			180
X.	180	165	150	135	120	105	90		X L	180	165	150	135	120	105	90
36003 113603 12360 12360 12360 12360	082 078 073 064 054	.081 .076 .061 .050 .034	.089 .081 .076 .0657 .040	.096 .083 .082 .073 .060 .043	.101 .091 .086 .079 .062 .047	.108 .096 .091 .083 .067 .052	.110 .099 .092 .086 .069 .054		.037 .0603 .167 .203 .267	.087 .081 .073 .068 .056	.081 .074 .068 .068 .049 .034	.086 .079 .074 .0652 .052	.096 .087 .081 .073 .060 .044	.100 .093 .086 .076 .0648 .039	.104 .093 .087 .078 .064	.111 .098 .092 .085 .067 .056
3370370370370370370370370370370370370370	016 007 0005 -00119 -0019 -0024 -0034 -0034 -00447 -00549 -0054	013 0006 0009 -014 -0229 -0348 -0415 -0445 -0445 -0533	0212 0009 -0007 -00163 -0025 -0025 -00445 -00448 -00449	23112750785559377392 0011000182883333445392 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	024 0113 0013 0013 0017 0017 0017 0017 0017	028 00165 -00105 -0015 -0015 -00289 -00347 -00527 -00557 -0057	.027 .020 .010 .000 .000 .000 .000 .000 .000		3003 33670 43670 44603 55603 56670 7703 7760 88670 88670 900	.020 .0006 .0006 .0006 .0014 .0014 .0024 .00325 .0039 .0049 .00503	.0124 .000437 00124 00124 003325 0045 0045 005537 005557	.0117 -00039 -00160 -00280 -003356 -00344 -00472 -00550	.024 .01143 .00137 .00037 .0014752 .003379 .0045666	02143354 001147584460533 0000147588460533 0000000000000000000000000000000000	02113353871693936393639393939393939393939393939393	.03013 .0113 .00171 .00019 .00124 .00318 .004529 .004529 .00645 .0050
.933 .967 1.000	048 044 065	052	047 044 060	051 042 063	052 040 062	049 040 062	058 043 065		.933 .967 1.000	043	055 042 030 060	034 034 028 057	042 036 032 063	040 037 036 064	048 044 045 069	051 054 061 077

32

NACA RM L54J29

$$\begin{bmatrix} M = 2.01 \end{bmatrix}$$

€=-3°	$\frac{2\beta y}{L(1-\epsilon\beta)}$ =	.76
	L(I Ep)	

_	=-3°		
_	0		

$$\frac{2\beta y}{L(1-\epsilon\beta)} = .66$$

X O O O O O O O O O O O O O O O O O O O	136 122 1114 1113 77 .088	30 .154 .143 .127 .108 .091 .082	45 .154 .146 .133 .124 .115 .095	60 •138 •130 •116 •108 •093 •080	75 .124 .115 .105 .096	90
.067 .142 .100 .123 .133 .114 .167 .107 .200 .087 .267 .066 .267 .066 .3303 .054 .3367 .064 .430 .036 .430 .054 .433 .054 .435 .066 .535 .012 .535 .012 .535 .012 .535 .012 .535 .026 .6667 .026 .667 .026 .700 .008	136 122 1114 1113 77 .081	.143 .123 .117 .108 .091	.146 .133 .124 .115	.130 .116 .108 .093	.115 .105 .096	.109
.333 .367 .046 .367 .008 .503 .503 .001 .533 .012 .567 .016 .600 .026 .633 .026 .036 .036 .036 .036 .036 .036 .036 .03			.069	.071	.068 .058 .039	.069 .060 .050
.800022 .833033 .867041 .900063 .933075	42955889375588937568893779950012827558893756889375950001282500012845000128450001284500012845000012845000000000000000000000000000000000000	05431870011214 0010701121- 00107000554- 0000554-	055904404 0004917 0000177 0001209916 000017 000069 000017 000069 00004466	0 4 0 0 32 2 9 0 0 0 0 0 4 1 0 0 0 0 0 1 1 8 1 0 0 0 0 0 0 2 4 1 0 0 0 0 0 0 2 7 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0324520001699665444628316000161233344462833165776	02218 00218 -00057 -001241 -002342 -00458 -00458 -00458 -00458 -00469 -00676

X				θ			
L	0	15	30	45	60	75	90
.033 .067 .1033 .167 .200 .233 .350	.156 .1455 .131 .1210 .095 .087	.1498 .1266 .12051 .10991 .00865	.148 .138 .124 .119 .103 .089 .080	.152 .146 .132 .131 .1111 .097	.1329 .1124 .1114 .0978 .0060	.121 .1104 .098 .082 .060	.120 .111 .098 .090 .077 .059
.3367 .4003 .44003 .55367 .66367	.057 .049 .0312 .0112 .0014 .0408 .0326	.04297 .00211 .000157 .000157 .00045	05435562 000100017633	055426555 00426555 0000004 000004 0011	.039 .033 .021 .007 005 0014 012 0016 003	.028 .0102 .00102 0017 0027 00212 0013	.027 .025 .012 003 013 019 031 039 012
.700 .733 .767 .800 .833 .867 .900 .933	0014 0148 0428 0566 0682 0866	0016 030 042 057 068 088	002 019 033 045 058 0683 080	003 019 029 043 058 061 081	021 030 044 053 062 068 094	024 0345 045 062 062 085 092	036 042 047 058 062 067 079

x				θ			
X L	180	165	150	135	120	105	90
.033 .067 .100 .133 .167 .203	.085 .076 .070 .053 .054	.080 .074 .0659 .049 .032	.085 .078 .070 .063 .053 .037	.096 .086 .079 .072 .061	.099 .089 .081 .073 .060	.105 .093 .088 .079 .065 .051	.111 .099 .090 .083 .064 .056
0036037037037037037 0333344460360360360360360360360360360360360387	.019 .011 .004 002 008 015 026 029 033 037 042 053 054 053	.013 .0007 -0007 -0013 -0021 -0021 -0030 -0041 -0040 -0050 -	.016 .0097 -0004 -012 -018 -028 -028 -0356 -0356 -0436 -0504 -0504 -0504 -039	.022 .014 -001 -0016 -018 -024 -030 -033 -0337 -042 -044 -038 -036	.024 .015 .0015 .0018 -0018 -0028 -0028 -0033 -0049 -0049 -0049	.026 .017 .016 .004 005 019 026 028 0337 044 048 048 049 049	. 0 2 9 . 0 1 9 . 0 1 9 . 0 0 1 4 . 0 0 1 2 . 0 0 1 7 . 0 0 3 0 . 0 0 3 0 . 0 0 4 3 . 0 0 4 4 . 0 0 4 8
.900 .933 .967	030 018 015 049	033 025 024 060	032 025 023 058	034 030 030 062	044 041 040 068	053 052 052 073	064 068 070 088

X				θ			
L	180	165	150	135	120	105	90
033 067 100 133 167 200 233	.085 .074 .067 .061 .054 .036	.078 .071 .064 .058 .048 .032	.087 .076 .071 .065 .055	.098 .089 .082 .074 .064 .048	.097 .087 .079 .072 .062	.104 .091 .086 .080 .067	• 111 • 097 • 088 • 084 • 069 • 052 • 044
25033703370337033703370337033703370337033	.019 .009 .009 .009 -016 .020 -025 -031 -037 -044 -043 -044 -043 -033 -033 -026 -022	.013 .0006 .0006 .016 .028 .028 .0337 .0044 .0045 .0045 .0040 .004	02122 001122 0001010 0001019 00000000000	.028 .0118 .0005 .0004 .0001 .0003	0246500016500010001000100010001000100010001	.027 .019 .016 .004 .005 .015 .019 .025 .034 .033 .039 .039 .045 .045 .057	028 0119 001034 0001376 000176 0003176

0

TABLE 3.- PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE

$$\left[M = 1.41\right]$$

 $\frac{2\beta y}{L(1-\epsilon\beta)} = .98$ € = 0°

X			10.00				
L	0	15	30	45	60	75	90
0038754219865320 00111193600465320 00371149360046532600	013 013 0019 010 010 010 010 010 010 010 010 010	014 015 0112 0139 0019 0010 0010 00095 00023		009 009 009 006 007 004 005 003 000 000	001 0001 0001 0000 0001 0000 0001 0001 0001	- 00 3 - 00 2 - 00 6 - 00 1 - 00 2 - 00 7 - 00 5 - 00 7 - 00 5 - 00 7	010

01119865320875421986532087542198	-009 -0110 -0013 -009 -010 -010 -0010 -0010 -0010 -005 -009 -009 -009 -009 -009 -009 -00	0112 013 009 010 010 010 009 005 003	0037 0097 0094 0005 0005 0002 0002 0002 0008 0008 0008 0008 0008 0008	003 007 007 005 005 003 003 003 000	.0001 .0002 -001 .0002 -001 .0002 .0001 .0005 .0005 .0005 .0009 .0009	- 0026 0006 00012 0005 0005 0005 0005 0007 0005 0007 0009 0009	001065 001065 0000065 000000000000000000
.692 .731 .769 .808 .846	.012 .044 .086 .081 .076	.009	.007	.008	.006	.004	.005
.923 .962 1.000	.079 .073 .069	.073	.082	.055 .075 .081	.010 .010 .014	.009	.008

 $2\beta y$

		€=0		L(I-E	3)=./3						
X	Ψ										
L	0	15	30	45	60	75	90				
0000 0387 1154 1154 1192 2698 3465 3386 4222 6500 8346 5008 7731 8086 8885 7754 8086 8885 7960	013 0121 00121 00122 00122 0002 00042 0004 	- 0 1 0 0 1	0116 00198 00098 00098 00075 00042 00023 00042	007 007 007 004	001 -001 -002 -002 -002 -002 -002 -002 -	001 0033 00103 001032 001032 000032 0005 	0 0 5 0 0 4 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 0 0 5 0 0 0 0 0 0 0 0 0				

 $\frac{2\beta y}{L(1-\epsilon\beta)} = .86$ € = 0°

X				Ψ			
L	0	15	30	45	60	75	90
0871548198653808754481986538141414141414886537715481986648388	- 0 1 5 - 0 1 6 - 0 1 1 1 - 0 1 1 1 - 0 1 1 2 - 0 1 1 3 - 0 1 1 3 - 0 1 1 3 - 0 0 1 5 - 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	015 015 015 0112 0012 0008 0008 0004 0004 0004 0004 0008 0004 0008 000	0111 00097 00077 00076 00064 00064 00064 00064 00064 00067 00067 00064 00067 00066 00067 00066	- 0 0 8 - 0 0 7 - 0 0 4 - 0 0 3 - 0 0 3 - 0 0 0 4 - 0 0 3 - 0 0 0 2 - 0 0 0 2 - 0 0 5 - 0 0 0 8 - 0 0 9 - 0 0 12 - 0	003 002 .0001 .0001 .0001 .0001 .0001 .0001 .0002 .0005 .0007 .0007 .0007 .0007 .0007 .0007 .0007 .0007	001 001 0004 0002 0004 0004 0004 0004 00	.000

		€ = 0°	L	$\frac{2\beta y}{(1-\epsilon\beta)} = .6$	60	
x				Ψ		
	0	15	30	45	60	75
.000 .038 .077 .115 .154 .192 .2369	014 016 013 013 011 013 015	013 013 008 009 010 007 009 008	016 013 009 011 010 011	011 010 002 007 009 008 007	008 007 003 005 005 005	- 00

TABLE 3.- PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE - Continued

$$\left[M = 1.41\right]$$

 $\epsilon = 0^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .48$

		Ψ									
X	0	15	30	45	60	75	90				
087542198653208754219865320 03711593604826037115936048260 00111223333445555666778888990	- 0195 - 0195 - 0146 - 01132 - 01146 - 01132 - 01173 - 01173 - 01173 - 01074 - 01132 - 01074 - 01081 -	014 -0169 -0123 -0	0114 01112919963199631995 00011100100000000000000000000000000	0115800110009885100811009908510080081100990855100890851009000855100900855100900851009008510090085100900666	- 0008 -	270133010 00000000 000000000 000000000 0000000	00100000000000000000000000000000000000				

 $\epsilon = 0^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .35$

	Ψ								
X L	0	15	30	45	60	75	90		
0875421986532087542198653200 0377159360482603715936048260 001111223333445555666776888990	018 -017 -015 -015 -015 -013 -013 -016 -017 -016 -017 -017 -016 -017 -017 -018 -019 -019 -019 -019 -019 -019 -019 -019	011 -011 -0129 -00129 -0007 -0	0117355247 0017355247 00115520114117 001155201141111059550007 001141111059550007 001141111059550007 001141111059550007 001141111059550007 001141111059550007 001141111059550007 001141111059550007 001141111059550007 0011411111059550007 0011411111059550007 0011411111059550007 0011411111059550007 0011411111059550007 0011411111059550007 0011411111059550007 00114111111059550007 0011411111059550007 0011411111059550007 00114111111059550007 0011411111059550007 00114111111059550007 0011411111059550007 0011411111059550007 001141111105950007 0011411111105950007 0011411111105950007 0011411111105950007 001141111111105950007 001141111111059500007 00114111111111111111111111111111111111	1327 10107 10107 10107 10108 10107 10108 10107 10108 1	- 011077		0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		

 $\epsilon = 0^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .20$

X				Ψ			
T	0	15	30	45	60	75	90
087542198653208754219865320 0377154219865337154219865320 1112223375444555566677788888260	0137 0010089 0010089 001098 001098 001098 00113	995883767004356704876466548	6401202959184426852712 000000000015145451976472252712 	43122127978498069155640555440586055544058	005564 000568462 0006898673368908113368 -113368908485008867936 008868686868686868686868686868686868686	911666914488689 001000914488689 11233311651729739929 111233311651729739929	-000 000 000 000 000 000 000 000 000 00

TABLE 3.- PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE - Continued.

$$\left[M=1.41\right]$$

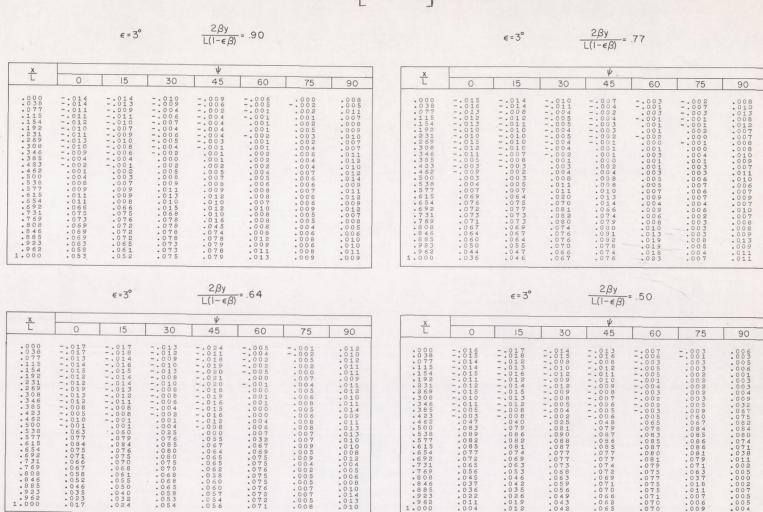


TABLE 3.- PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE - Continued

$$\left[M = 1.41\right]$$

$$\epsilon = 3^{\circ}$$
 $\frac{2\beta y}{L(1-\epsilon\beta)} = .37$

X				. Ψ			
L	0	15	30	45	60	.75	90
003775421931998600000000000000000000000000000000000	- 0 14 - 0 152 - 0 152 - 0 0114 - 0 014 - 0 0194 -	71615151433320 0021615151433320 00115151433320 00115151433320 00115151433320 00115151433320 0011515145151515151515151515151515151515	579128911899793157912899988744838419900000000000000000000000000000000000	- 0 0 0 9 5 6 6 8 5 5 9 0 6 6 7 7 5 9 0 6 6 5 7 0 6 6 5 7	0004 0004 0004 00053 -	0072 0072 0003 0003 0003 0002 0003 0002 0003 0002 0003 0002 0003 0002 0003 	.003 .001 .006 .0002 .002 .002 .005 .005 .005 .005 .00

€ = 3°	2βy	2 1
C - 3	$\frac{2\beta y}{L(1-\epsilon\beta)} = .2$	- 1

X	Ψ									
L	0	15	30	45	60	75	90			
00387554219866532201986865322666576088882600	014 0019 0019 0123 0113 0	01184 011821011521001327 0010911001327 0010911001327 0010911001327 001091001327 001091001327 001091001327 001091001327 001091001327 001091001327 001091001327 001091001327 001091001327	2010576563030303030303030303030303030303030303	- 0 11 - 0 010 - 0 00 5 - 0 00 7 - 0 00 8 - 0 00 8 - 0 02 9 - 0 02 9 - 10 43 - 11 08 - 10 8 - 10 8	- 0099 - 0096 - 00067 - 0007355 - 000714 - 00958 - 11060 - 11058 - 11060 - 11058 - 00958 - 009	0002 0002 0002 0002 0002 0003 000	00000000000000000000000000000000000000			

TABLE 3.- PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE - Continued.

$$\left[M = 1.41\right]$$

 $\epsilon = -3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .94$

X	Ψ									
L	0	15	30	45	60	75	90			
0 7 7 7 6 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	.014 .014 .011 .011 .011 .011 .010 .009 .010 .009 .011 .005 .005 .009 .004 .005 .009 .009 .009 .009 .009 .009 .009	45033381010973314467952252338816	11066775655531004890029221133999423		- 00 4 - 00031 - 00022 - 00022 - 00000 - 000000 - 00000 - 00000 - 00000 - 00000 - 00000 - 00000 - 0000000 - 00000 - 00000 - 00000 - 00000 - 00000 - 00000 - 000000 - 00000 - 00000 - 00000 - 00000 - 00000 - 00000 - 0000000 - 00000000 - 000000 - 000000 - 00000 - 00000 - 00000	000089913320998100001113200001110300111477111878810001110300111000011100001110000111000011100001110000	0077 0014 0004 0004 0004 0005 0006 0006 0006 000			

€=-3°	2βy
e 3	$\frac{\Delta\beta\gamma}{L(1-\epsilon\beta)}$ = .81

X	Ψ								
T	0	15	30	45	60	75	90		
003775482190860371548220087756659392608756669939666992600	0 1 9 0 1 8 0 1 9 0 1 8 0 1 9 0 1 4 0 1 4 0 1 6 0 1 6 0 1 6 0 1 7 0 1 4 0 1 8 0 1 9 0 1 9	-0192 -0192 -0115 -01165 -011072 -00117 -001074 -001074 -00007	777253323110035360000000000000000000000000000000	006 005 000 0003 0002 0002 0004 000	004 002 003 003 002 003 002 002 003 004	137 0000549 0000549 000099 000099 000099 000099 000099 000099 000099 000099 000099 000099 000099 000099 000099 000099 000099 000099	.0063 .0133 .0094 .0047 .0064 .0099 .0099 .0099 .0094 .0099 .0099 .0099 .0099 .0099 .0099 .0099 .0099		

 $\epsilon = -3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .70$

X	Ψ									
L	0	15	30	45	60	75	90			
0387544811986603775448514986653374548533746666533766665376666667766666776666677666667766666776666	- 016 - 018 - 015 -	- 0 1 7 - 0 1 7 - 0 1 7 - 0 1 7 - 0 1 4 - 0 1 1 7 - 0 1 2 -	211588857552103368932551985597	008 0103 003	002 00013 00013 00011 00011 00045 00045 00045 0008 00099 00137 00133 00288 00288 00386 -	- 00023 - 00023 - 00010 - 00022 - 000126 - 00022 - 00022 - 00055 - 00086 - 000	75866578474767655555574474488767676555555744744887676767655555774744887676777			

€=-3°	$\frac{2\beta y}{L(1-\epsilon\beta)} = .54$
6-5	$L(1-\epsilon\beta) = .54$

X				4			
L	0	15	30	45	60	75	90
087542198653208754219865320 00371533360482603515936048280 000111162333344555506667788880 000111162333344555506667788880 0001116233344555506667788880 00011162333444555506667788880 000116233488880	90068000771777 -001280001217777 -0012817711777 -00012117777 -000811111109899000000000000000000000000	01140 011111100000000000000000000000000	011114911997648989696877766547	01160 -00123 -00123 -00123 -001000098 -001000098 -001000098 -00000000000000000000000000000000	- 0 1 2 - 0 1 1 - 0 0 1 - 0 0 1 - 0 0 1 - 0 0 0 8 - 0 0 0 0 6 - 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	002 0010 0011 0001 0	.000 .000 .000 .000 .000 .000 .000 .00

TABLE 3.- PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE - Continued

$$M = 1.41$$

 $\epsilon = -3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .50$

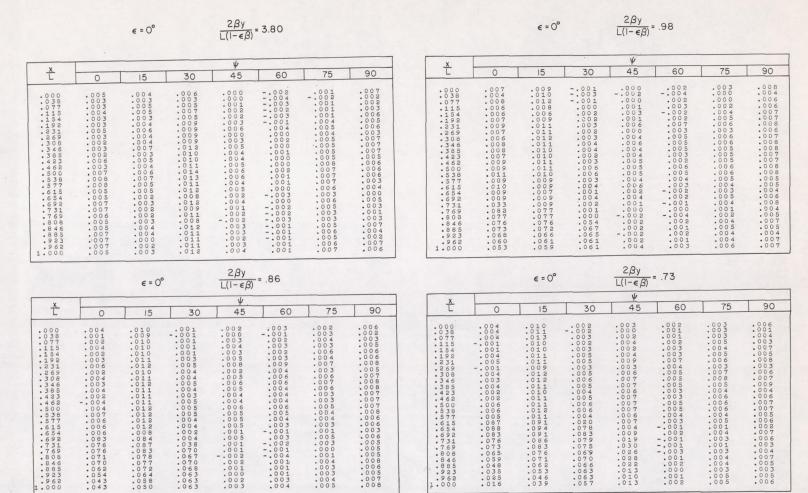
Y				Ψ			
Ê	0	15	30	45	60	75.	90
0 0 0 0 0 0 3 8 7 7 1 1 5 4 2 2 3 0 8 4 6 5 3 2 8 5 7 7 5 6 5 5 4 2 8 2 7 3 1 9 8 8 8 8 5 3 2 8 6 9 6 2 6 6 9 6 8 8 8 5 3 9 6 2 6 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	- 021 - 022 - 018 - 018 - 021 - 017 - 017 - 017 - 0017 - 0019 - 007 - 009 - 00	13209118865520000000000000000000000000000000000	0113398119997 -0000866119997 -0000866119997 -0000866119997 -000044 -000044 -00001388994 -11084811084 -1108636367 -006655	0116669997775300000000000000000000000000000000	- 0067 - 0001 - 0004 - 0004 - 0004 - 0001 - 0001 - 0001 - 0002 - 0004 -	-001 -005 -005 -002 -002 -005 -005 -005 -005	- 001 - 001 - 001 - 001 - 001 - 001 - 001 - 001 - 003 - 003

 $\epsilon = -3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .39$

X	Ψ									
T	0	15	30	45	60	75	90			
0 0 775 1 1 1 5 4 2 2 1 2 3 0 4 6 6 5 2 2 2 3 0 4 6 6 5 5 7 7 5 6 6 6 5 4 2 2 3 0 4 6 6 5 5 7 6 6 6 5 4 2 2 3 0 4 6 6 5 6 5 4 2 2 3 0 4 6 6 5 6 5 6 6 6 5 4 2 6 6 6 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	7 0118 00167 00165 001149 00115 4 00115 4 00115 4 111237 1117 2 11027 1 1027 1 1027 0048 00147 0047 0047	-00126 -00126 -0007 -0007 -0007 -00046 -00017 -11298 -11243 -11174 -00837 -0024 -0008	-014 -018 -009 -0009 -0009 -0007 -0007 -0007 -0007 -0007 -0008 -1127 -1198 -11	- 0128 - 00128 - 00099 - 000087 - 000087 - 000087 - 000087 - 000087 - 12022 - 11202 - 11202 - 11202 - 11208 -	-014 -0010 -	1233124 -000012470519384 -000005112283428 -1122738284 -11210999399399602151	.000 .005 .000 .000 .005 .005 .042 .093 .102 .121 .135 .121 .135 .121 .116 .005 .005 .005			

TABLE 3.- PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE - Continued

$$\left[M = 2.01\right]$$



.002

TABLE 3.- PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE - Continued

$$\left[M = 2.01\right]$$

 $\epsilon = 0^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .60$

 $\epsilon = 0^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .48$

×	Ψ									
Î	0	15	30	45	60	75	90			
0037554819866532 003711593604826087754819886532 4553215936048266667768888829960	00049 00047 00047 000047 00005 000005 000005 000000	022022211231345325247014157	12113458465557488666971105963	00008038088454345669595958661128486695959586666666666666666666666666666	00000000000000000000000000000000000000	0007700119 00119 0011700110 00107700110 0010770000000000	00 7 00 8 00 4 00 4 00 0 4 00 0 5 00 0 6 00 0 4 00 0 7 00 0 8 00 0 6 00 0 0 0 0 0 0 0 0 0 0 0			

×	Ψ											
T	0	15	30	45	60	75	90					
0017754219986532 00177542119986532 011593160482600877542 112260486532 0116593198686532 0116593198686532	00133 00013 0002 0002 0002 0004 0004 0005 0002 0005 0006 0006 0006 0006 0006	00001111211100023144903128558889	000024 000024 000026 0000000000000000000	- 000 2 - 000 2 - 000 2 - 000 2 - 000 2 - 000 2 - 000 3 - 000	- 0001 - 0001 - 0001 - 0001 - 0000 - 00000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 00000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 00000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 00000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 0000 - 00000 - 0000 - 00	00000688232000006678	0 0 9 3 0 0 5 5 0 0 6 6 0 0 7 0 0 0 7 0 0 0 7 0 0 0 0 7 0					

 $\epsilon = 0^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .3$

X	Ψ										
Ť	0	15	30	45	60	75	90				
08775421986532087554219866572 003711593360482603715933604826 003711593360482603715933604826	004 007 007 006 0006 0006 0006 0006 1111 1122 1102 0016 1107 0081 0081 0081 0081	007 0009 0009 0008 00097 0009 00097 11269 11269 110023 1105 00456 00456	002 -00013 .00032 .00032 .00063 .00076 .00076 .00444 .11202 .0083 .00861 .007644 .008673	0000 -0004 -0005 .0005 .0008	001 -0032 -0001 -0006 -0001 -0006 -0004 -0008 -0004 -0008 -0	008 0006 0006 0006 0006 0010 0010 00118 00911 11120 11120 11120 0087 0000 0000 0000 0000 0000 0000 00	004 003 0005 0005 0016 003 0017 0082 0098 0116 1113 0094 0094 0095 0095 0095 0095 0095 0095				

TABLE 3.- PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE - Continued

$$\left[M = 2.01\right]$$

		€ = 3°		2βy 	= 4.10						€=3°		$\frac{2\beta y}{L(1-\epsilon\beta)} =$.94		
X				Ψ				X					Ψ	1		
L	0	15	30	45	60	75	90	L		0	15	30	45	60	75	90
000777542198665320042331986653271598666776848882860	011213000000011234414133212230001130001123414141332122300000001113	00000000000000000000000000000000000000	0 5 2 4 5 4 5 0 0 0 0 4 5 0 0 0 0 4 5 0 0 0 0	0053666789958989000079956587979766799	- 002 - 0002 - 0002 - 00004 - 00003 - 00005 - 00004 - 0005 - 00004 - 00005 - 00004 - 00005 - 00006 - 00006	009 0009 0008 0011 0011 0011 0012 0012 0012 0011 0011 0011 0011 0010 000	010010015010	55566667788	59360482603715936048	008 0009 0009 0005 0005 0006 0006 0006 0006	0000333300044000340000440000440000440000440000440000440000	0 75 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 9 0 0 0 9 0 0 1 0 0 0 5 0 0 7 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 5 0 0 0 5 0 0 0 5 0 0 5 0 0 0 5 0 0 0 5 0 0 0 0	0 0 5 0 0 4 0 0 7 0 0 6 0 0 7 0 0 6 0 0 7 0 0 6 0 0 7 0 0 6 0 0 7 0 0 0 6 0 0 0 7 0 0 0 6 0 0 0 7 0 0 0 6 0 0 0 7 0 0 0 6 0 0 0 7 0 0 0 6 0 0 0 7 0 0 0 6 0 0 0 7 0 0 0 6 0 0 0 7 0 0 0 6 0 0 0 0	- 00 31 - 00 00 22 - 00 01 3 - 00 00 4 - 00 00 2 - 00 00	0 0 4 0 0 2 0 0 4 0 0 6 0 0 6 0 0 0 7 0 0 0 6 0 0 0 9 0 0 0 8 0 0 0 8 0 0 0 8 0 0 0 9 0 0 0 4 0 0 0 9 0 0 0 9 0 0 0 9	0 0 5 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 1 0
		€=3°		<u>2βy</u> <u>L(1-εβ)</u>	= .80						€=3°		$\frac{2\beta y}{L(1-\epsilon\beta)} =$.66		
x				Ψ		7.5	1 00	X	_		15	70	45	60	75	90
X L	0	15	30	45	60	75	90			0	15	30	45			
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	00000000000000000000000000000000000000	-00000 -00000 -00001 -00000 -00012 -0	22334564 00000 00000 00000 00000 00000 00000 0000	0 0 4 0 0 1 0 0 6 5 0 0 0 4 6 0 0 1 0 5 9 0 0 0 1 0 5 9 0 0 0 0 9 8 0 0 0 0 8 8 0 0 0 0 7 6 0 0 0 0 7 6 0 0 0 0 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0085 00098 00079 00149 00111 00108 00109 00109 00109 00007 00005 00007	00457780087000760010000000000000000000000000	006 001 002 002 0003 0003 0007 0007 0004 0004 0004	4 4 5 5 5 5 6 6 6 7 7 7	71593604826037159360	0063 0007 0004 0007 0004 0007 0005 0005 0007 0005 0007 0005 0007 0005 0007 0005 0007 0005 0007 0004 0007 0004 0007 0004 0007 0004 0007 000007 0000	00000000000000000000000000000000000000	00000000000000000000000000000000000000	0 0 7 0 1 0 1 0 0 1 0 0 1 0 0 0 0 0 0 0	007 0098 0008 00108 001108 00111 00100 00111 00100 00110 00100 001	004 0004 0004 0004 0005 0005 0005 0009 0009	005112055113753600000000000000000000000000000000000

TABLE 3.- PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE - Continued

$$\left[M = 2.01\right]$$

$$\epsilon = 3^{\circ}$$
 $\frac{2\beta y}{L(1-\epsilon\beta)} = .52$

X	Ψ										
T	0	15	30	45	60	75	90				
.000	.002	.002	.007	.003	.006	.002	.002				
.038	.003	001	.004	.002	.003	.001	.002				
.077	.006	.001	.008	.004	.004	.005	001				
.115	.004	.001	.005	.005	.005	.004	.001				
.154	.003	001	.007	.006	.005	.005	.004				
.192	.005	.004	.008	.005	.006	.004	.004				
. 231	.009	.004	.009	.010	.011	.008	.004				
. 269	.008	.001	.006	. 0 0 4	.006	.004	.001				
.308	.005	.003	.008.	.006	.009	.007	.004				
. 346	.006	.004	.010	.008	.008	.008	.006				
. 385	.006	.001	.009	.005	.006	.012	.063				
. 423	.006	.002	.008	.044	.057	.068	.070				
. 462	.004	.004	.025	.078	.080	.080	.074				
.500	.078	.080	.087	.080	.083	.078	.073				
.538	.080	.073	.083	.079	.081	.071	.034				
.577	.072	.069	.080	.080	.077	.058	.004				
.654	.064	.062	.071	.070	.066	.006	.001				
.692	.061	.057	.069	.073	.062	.007	.007				
.731	.052	.052	.064	.066	.038	.003	.005				
.769	. 0 4 4	.044	.060	.062	.013	.002	.001				
.808	. 034	.037	.056	.057	.004	.003	.003				
.846	.029	.033	.057	.063	.007	.007	.006				
. 885	.019	.029	.053	.061	. 0 0 4:	.006	.003				
.923	.020	.018	.049	.055	.004	.005	.002				
.962	.014	.013	.049	.053	.005	.009	.002				
.000	.000	.017	.046	.054	.010	.010	.003				

 $\epsilon = 3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .39$

Υ .		Ψ										
X L	0	15	30	45	60	75	90					
.000	.003	001	.004	.002	.004	.004	.000					
.038	.005	003	.005	.001	.003	.005	003					
.077	.005	.000	.006	.004	.003	.004	003					
.115	.004	001	.005	.002	.004	.004	001					
. 154	.007	.000	.006	.003	.005	.005	.000					
.192	.005	.000	.008	.008	.009	.008	.000					
. 231	.009	002	.008	.002	.005	.004	001					
.269	.002	.000	.007	.005	.008	.006	.003					
. 3 4 6	.005	.001	.009	.007	.008	.008	.049					
.385	.007	001	.008	.012	.043	.069	.076					
. 423	.081	.074	.080	. 079	.083	.083	.081					
. 462	.089	.086	.095	.090	.089	.088	.085					
.500	.091	.086	.093	.090	.091	.091	. 0.86					
.538	.080	.077	.086	.080	.087	.086	.089					
.577	.073	.068	.077	.077	.083	.084	.083					
.615	.067	.063	.074	.075	.081	.082	.072					
.654	.058	.052	.067	.068	.072	.066	.006					
.692	.067	.050	.066	.070	.072	.040	.003					
.731	.058	.056	.060	.064	.065	.006	.000					
.769	.041	.053	.056	.062	.057	.001	001					
.808	.026	.038	.052	.056	.038	.001	.001					
. 8 4 6	.013	.030	.056	.061	.014	.005	.004					
.885	002	.019	. 0 5 4	.058	.007	.004	.000					
.923	012	.006	.051	.054	.004		.001					
.962	019	.001	.052	.051	.006	.005	.002					
1.000	027	005	.049	. 0 3 4	.007	. 001	.002					

TABLE 3. - PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE - Continued

$$M = 2.01$$

 $\frac{2\beta y}{L(1-\epsilon\beta)} = 1.10$ $\frac{2\beta y}{L(1-\epsilon\beta)} = 3.57$ €=-3° Ψ ¥ 0 15 45 60 75 90 45 60 75 90 15 30 0 .000 .038 .077 .1154 .192 .239 .3346 .385 .003 .000 .003 .006 .004 .003 .000 .001 .007 .005 .007 .009 .008 .006 .007 .009 .004 .006 .009 .009 .009 .008 .005 .007 .008 .002 .008 .014 .009 .0109 .0109 .0109 .008 .0775 .1154 .1931 .2369 .3465 .3483 .013 .009 .014 .0110 .012 .014 .0111 .012 .005 .003 .004 .005 .005 .001 .004 .004 .005 .005 .009 .0104 .008 .0098 .004 .0037 .0077 .00053 .00053 .00053 .0004 .0004 .004 .003 .002 .004 .003 .001 .004 .001 .0133 .0115 .0115 .0113 .0113 .0112 .0113 .0113 .008 .008 .008 .0007 .0005 .0005 .0005 .0005 .0005 .0005 .0005 .009 .009 .010 .008 .009 .009 .009 .008 .007 .005 .007 .006 .007 .004 .005 .002 .004 .003 .000 .004 .003 .001 .009 .009 .005 .009 .007 .004 .005 .008 .007 .009 .005 .008 .005 .004 .008 .008 .009 .006 .006 .004 .008 .007 .004 .006 .006 .002 .004 .004 .000 .002 .001 .083 .093 .081 .084 .008 .007 .005 .007 .004 .005 $\frac{2\beta y}{L(1-\epsilon\beta)} = .87$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .99$ €=-3° € =-3° Ψ 30 45 75 90 15 30 45 75 90 .004 .004 .006 .006 .008 .007 .009 .009 .008 .008 - 00 31 - 00 02 - 00 03 - 00 03 - 00 03 - 00 03 - 00 05 - 00 06 - 00 0 .005 .004 .005 .007 .006 .009 .0110 .010 .005 .004 .009 .006 .006 .010 .006 .006 .001 .009 .005 .001 .003 .003 .007 .006 .009 .004 .007 .007 -.005 .0003 .0004 .0006 .0007 .0004 .0006 .0008 .0006 .0008 .001 .004 .008 .003 -.001 .011 .009 .008 .007 .007 .004 .006 .005 .006 .006 .006 .006 .007 .006 .010 .008 .009 .004 .009 .006 .006 .005 .007 .004 .003 .003 .006 .005 .009 .010 .006 .009 .007 .005 .004 .009 .006 .099 .098 .088 .093 .085 .009 .005 -.001 -.002 .078 .086 .0877 .068 .004 .006 .004 .003 .005 .004 .004 .006 .005 .007 .008 .010 .003 .846 .885 .923 .089 .081

TABLE 3.- PRESSURE-COEFFICIENT DATA FOR THE FLAT PLATE - Concluded

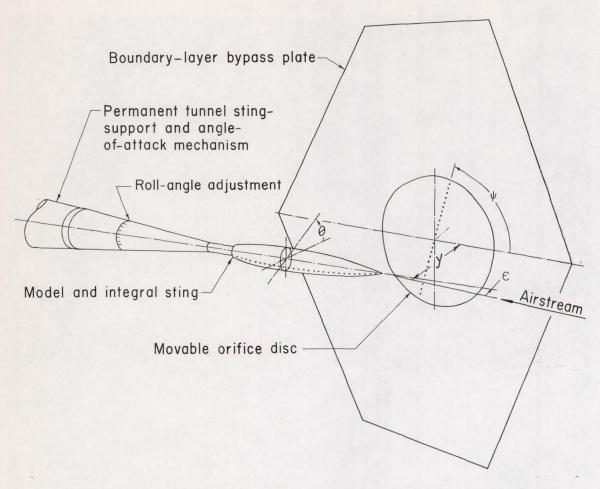
$$M = 2.01$$

 $\epsilon = -3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .76$

Y	Ψ										
î.	0	15	30	45	60	75	90				
.000	.009	.000	.003	.006	.006	.004	.005				
.038	.006	003	001	.006	.006	.006	001				
.077	.008	.002	.003	.008	.006	.005	.000				
.115	.005	.000	.004	.009	.006	.006	.002				
.192	.005	.003	.006	.007	.008	.007	.003				
. 231	.009	.004	.007	.011	.013	.010	.005				
. 269	.006	.001	.003	.005	.008	.006	001				
.308	.007	.004	.005	.009	.011	.010	.005				
. 346	.007	.004	.007	.010	.011	.010	.004				
. 385	.007	.003	.005	.009	.011	.006	.003				
. 423	.007	.002	.006	.010	.010	.008	.003				
.462	.008	.004	.006	.009	.010	.008	.005				
.538	.009	.003	.006	.009	.009	.008	.004				
.577	.009	.004	.004	.007	.010	.006	.003				
.615	.010	.003	.006	.008	.009	.006	.004				
.654	.106	.085	.004	.004	.005	.003	.001				
.692	.112	.106	.011	.007	.005	.004	.001				
.731	.104	.097	.092	.004	.003	.002	.003				
.769	.096	.089	.087	.004	.003	.004	.003				
.846	. 0.89	.088	.090	.007	.007	.006	.00				
.885	.078	.077	.085	.006	.007	.006	.005				
.923	.063	.064	.080	.004	.005	.004	.003				
.962	.051	.056	.079	.006	.005	.006	.004				
.000	.039	.048	.072	.007	.010	.009	.00				

 $\epsilon = -3^{\circ}$ $\frac{2\beta y}{L(1-\epsilon\beta)} = .66$

X	Ψ										
	0	15	30	45	60	75	90				
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	00066000000000000000000000000000000000	00012 000012 000012 000012 000012 00004 00012 00004 00012 00004 00012 00004 00012 00004 000012 0000012 000012 000012 000012 000012 000012 000012 000012 000012 0000012 00000000	5U 0001 0001 00023 000057 00034 00075 00076 11012 10999 11012 10999 109921 10987	0006 0007 0007 0008 0007 0008 0007 0013 0007 0011 0010 0011 0010 0010	00 8 00 0 8 00 0 4 00 0 7 00 0 7 00 0 9 00 1 1 00 1 2 00 1 0 00 1 0 00 1 7 00 0 9 00 1 0 00 0 7 00 0 9 00 0 0 7 00 0 0 0 00 0 0 0 0 0 00 0 0 0	0 2 2 0 0 0 1 1 5 0 0 0 0 1 5 0 0 0 0 5 7 0 0 0 0 6 8 0 0 0 0 7 7 0 0 0 6 5 0 0 0 7 7 0 0 0 6 4 7 0 0 0 6 8 7 0 0 0 0 6 8 7 0 0 0 0 0 6 8 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-0023 -0033 -0011 -0011 -0011 -0013 -0013 -0014 -0013 -0013 -0011 -0013 -0013 -0012 -0013				
.923	.048 .032 .016	.056	.077	.035	.011	.006	.000				



(a) Perspective view of test setup.

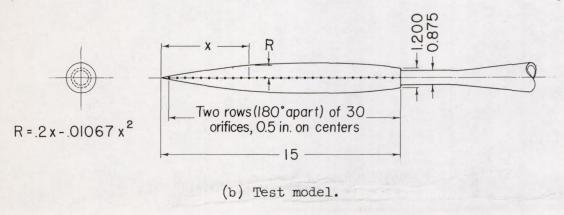


Figure 1.- Sketch of test apparatus. All dimensions are in inches.

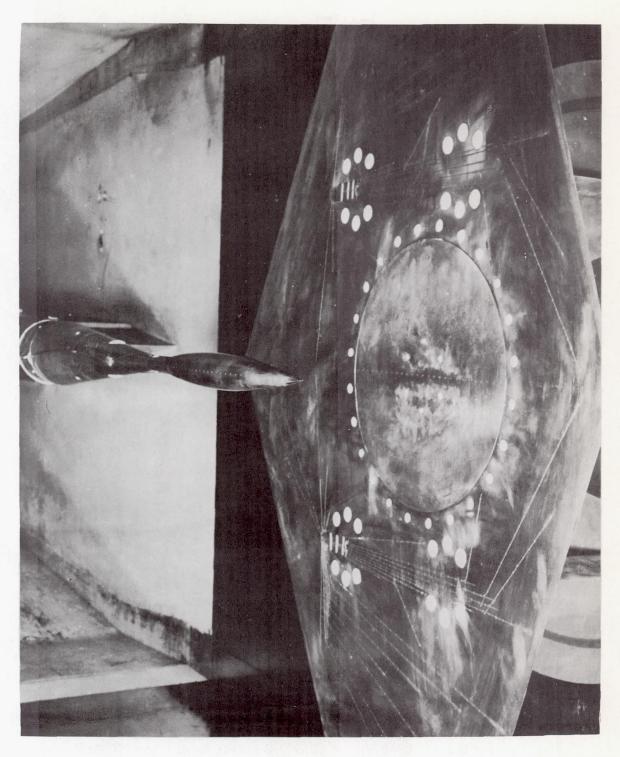


Figure 2. - Downstream view of test setup.

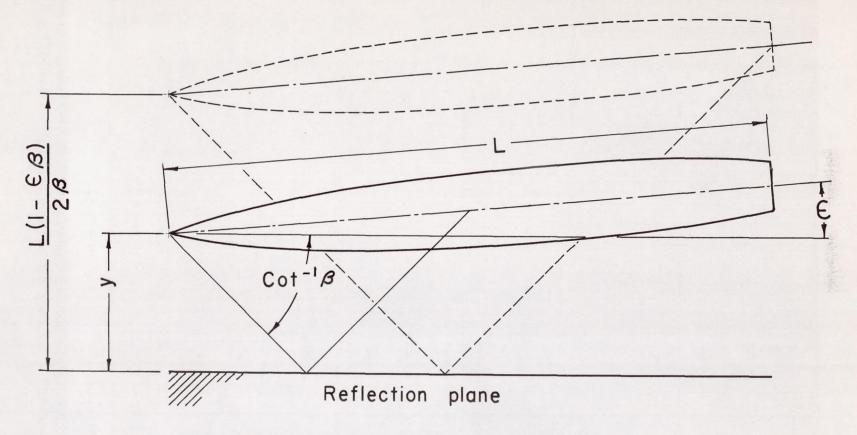


Figure 3.- Relation of model to reflection plane.

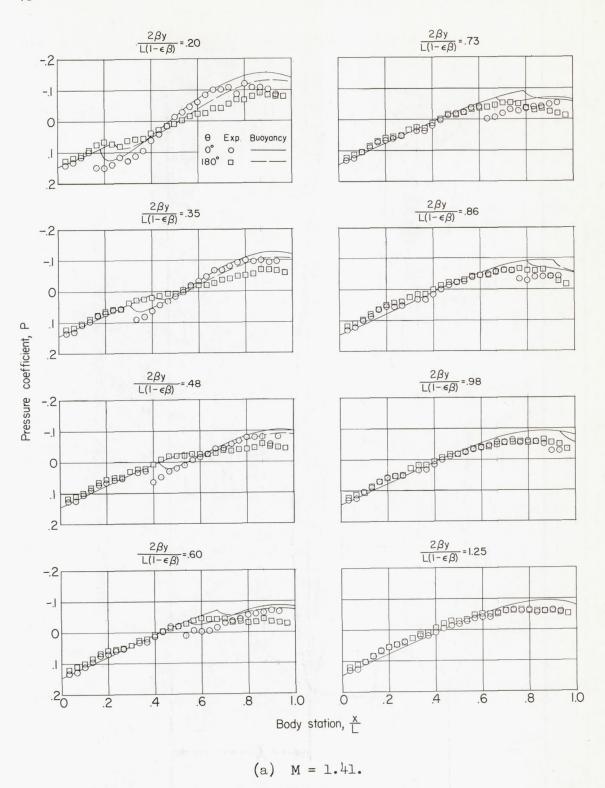


Figure 4.- Comparison between experimental and theoretical pressure coefficients on the body for various body-plate separation distances. ϵ = 0°.

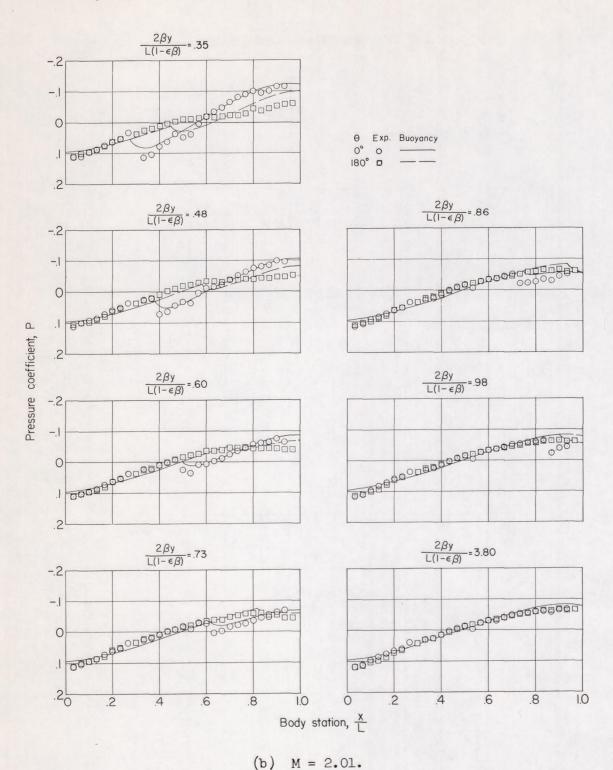


Figure 4.- Concluded.

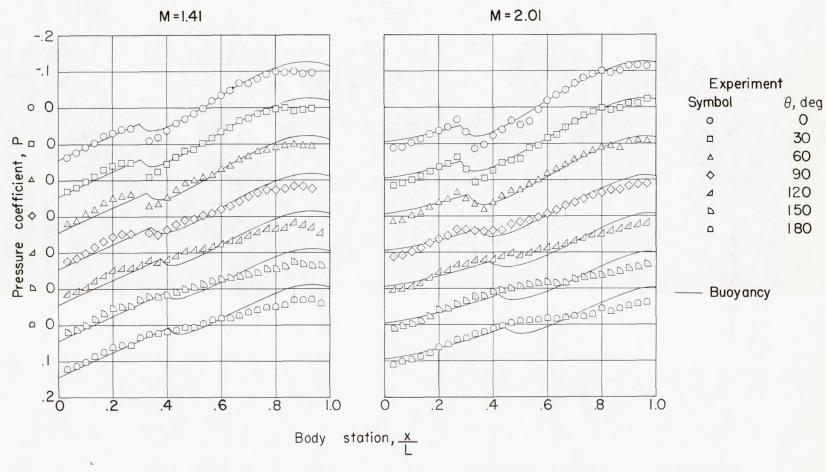


Figure 5.- Comparison between experimental and theoretical pressure coefficients on the body for a representative body-plate separation distance. $\frac{2\beta y}{L(1-\epsilon\beta)}=0.35;\;\epsilon=0^{\circ}.$

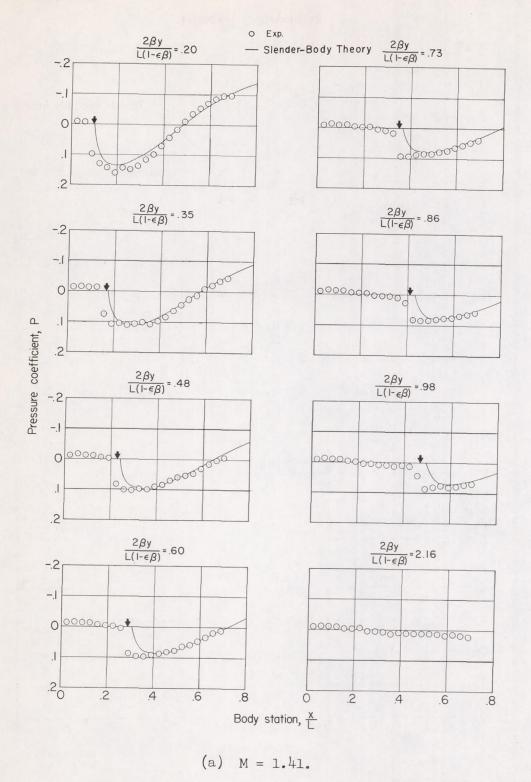


Figure 6.- Comparison between experimental and theoretical pressure coefficients on the plate for various body-plate separation distances. The arrows indicate computed shock-intersection points. $\epsilon = 0^{\circ}$.

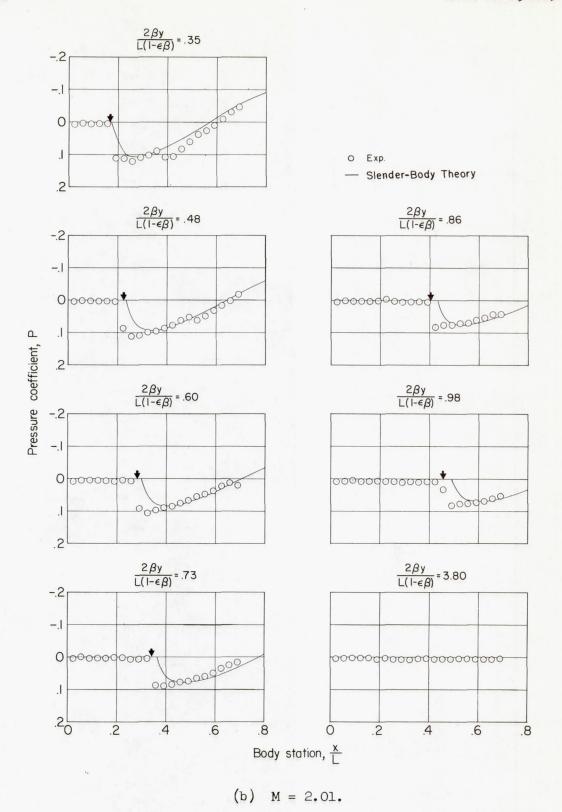


Figure 6.- Concluded.

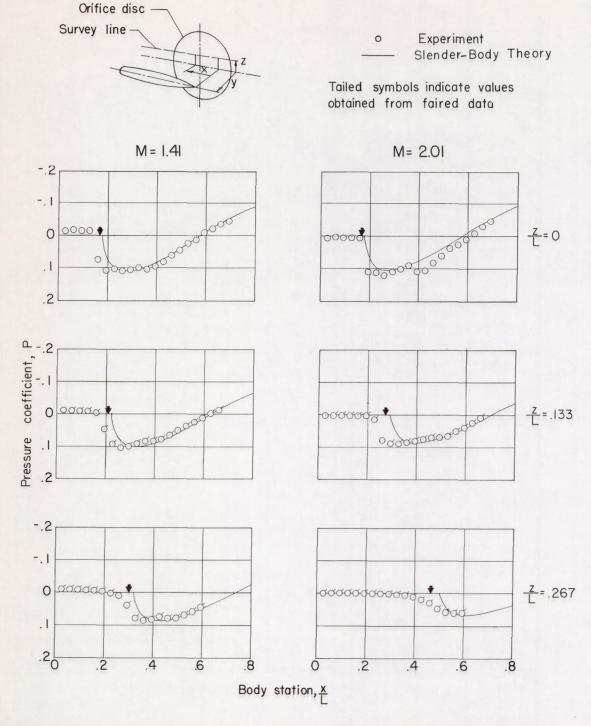


Figure 7.- Comparison between experimental and theoretical pressure coefficients on the plate for a representative body-plate separation distance. Arrows indicate computed shock-intersection points.

$$\frac{2\beta y}{L(1-\epsilon\beta)}=0.35;\;\epsilon=0^{\circ}.$$

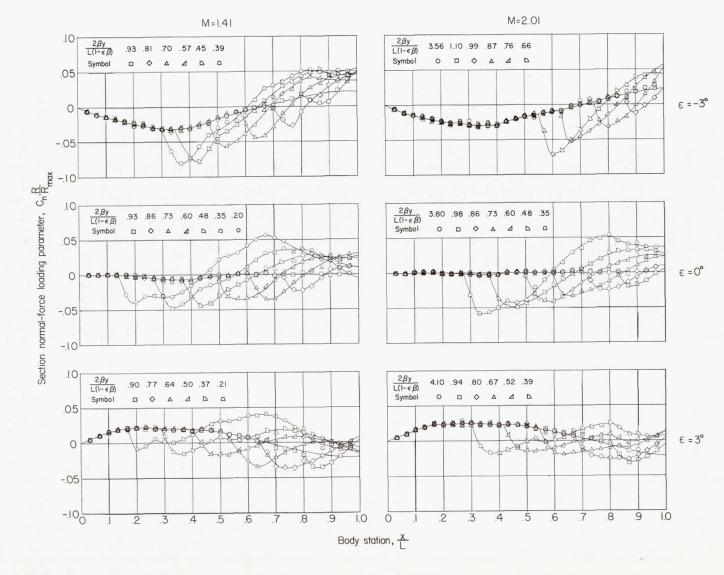


Figure 8.- Normal-force loading distribution on the body.

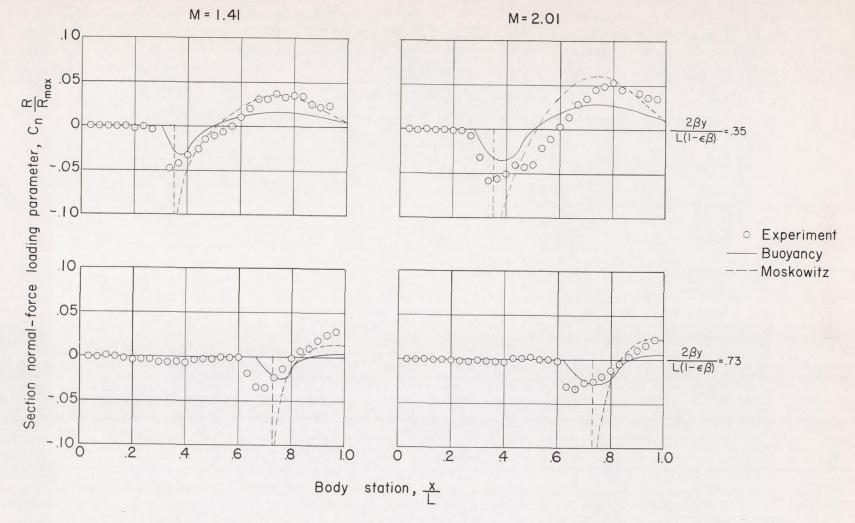


Figure 9.- Comparison between experimental and theoretical loading distributions for representative separation distances.

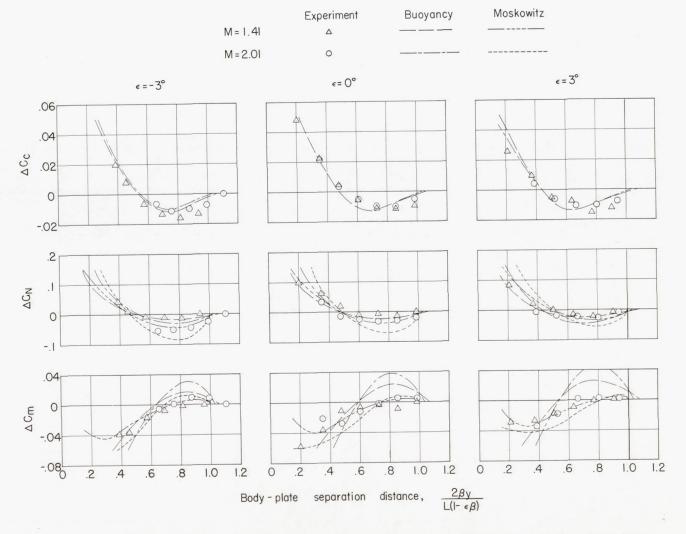


Figure 10.- Variation with body-plate separation distance of increments in the aerodynamic characteristics of the body due to body-plate interference.

NACA-Langle